

DOCUMENT RESUME

ED 176 255

CS 005 038

AUTHOR Schick, George B., Ed.; May, Merrill M., Ed.
TITLE The Psychology of Reading Behavior; Eighteenth
Yearbook of the National Reading Conference.
INSTITUTION National Reading Conference, Inc.
PUB DATE 69
NOTE 267p.; Proceedings of the National Reading Conference
(18th, Los Angeles, California, December 5-7,
1968;
EDRS PRICE MF01/PC11 Plus Postage.
DESCRIPTORS Elementary Secondary Education; Foreign Countries;
Grammar; Higher Education; Language Skills;
*Measurement Techniques; *Psychology; Readability;
Reading Diagnosis; Reading Difficulty; *Reading
Improvement; *Reading Instruction; Reading Programs;
*Reading Research; Reading Tests; Teacher
Attitudes
IDENTIFIERS *National Reading Conference

ABSTRACT

Focusing on the psychology of reading behavior, the 36 articles in this volume were drawn from the eighteenth annual meeting of the National Reading Conference held in 1968. Among the topics discussed in the articles are the following: eye movement, the psychology of reading behavior, reading improvement, reading tests, reading research, leisure reading habits of female teachers and other women of the same social status, an athletic department reading and study skills program, and "American Language Skills Course," linguistic assumptions and reading instruction, areas of confusion in the development of a science of reading, the relationship of college reading programs to educational counseling, rate controlled speech and listening comprehension, grammatical sense as a factor in reading comprehension, educational implications of research in RNA and DNA, student reading interests, the phonics skills of teachers and teacher education students, the readability levels of adult magazine materials, dyslexia, adult literacy, an informal reading inventory for the blind, behavior modification, assessing skimming and scanning skills improvement, the publisher's role in the evaluation of materials, and junior college reading programs. (FL)

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The Psychology of Reading Behavior

EIGHTEENTH YEARBOOK OF THE
NATIONAL READING CONFERENCE

Edited by
GEORGE B. SCHICK
and
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Publisher:
THE NATIONAL READING CONFERENCE, INC.
MILWAUKEE, WISCONSIN 53233

1969

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NATIONAL READING CONFERENCE, INC.
Reading Center, Marquette University
Milwaukee, Wisconsin 53233

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PREFACE

The Eighteenth Yearbook of the National Reading Conference contains the papers presented at the Eighteenth Annual Meeting which took place at Loyola University of Los Angeles, California, on December 5, 6, and 7, 1968.

The papers have been put together generally in the order in which they were presented at the Conference, with but two exceptions: the invitational address at the annual dinner meeting has been placed first, while the annual comprehensive summary of research in college-adult reading has been used as the final article.

The Journal of Reading Behavior

A Scholarly Quarterly in Reading

PURPOSE

The National Reading Conference has launched a new quarterly journal, **The Journal of Reading Behavior**, in January, 1969. This scholarly journal will publish mainly four types of articles: original research in reading and verbal behavior, discussions of theoretical positions, critiques of pedagogical approaches to reading instruction, and expository discussions of areas of concern in reading and related disciplines.

It is designed to provide a means of communication between those people interested in reading and those working in such related fields as psychology, counseling, remedial instruction, verbal behavior, and learning disabilities.

SCOPE

Generally, articles published in the journal will be on the secondary school, junior college, college, university, and adult education levels. However, any article dealing with significant aspects of reading behavior, regardless of the population employed, will be considered for publication. **The Journal of Reading Behavior** welcomes excellently conceived articles about significant issues in reading. In particular, it welcomes reports of research and theoretical articles which add valid information in such areas as the nature of the reading process, what the reading behaviors are, how to study reading behaviors, reading behavior as an aspect of verbal behavior, how one learns to process information, and improving reading behaviors.

FEATURES

The chief features of the journal will be an editorial page, scholarly articles, book reviews, and a readers' dialogue (commentaries from the readers on articles published in the journal and on issues in reading).

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The Journal of Reading Behavior will be published four times a year, Winter, Spring, Summer and Autumn. Individual subscriptions are \$6.00 per volume per year. A special annual rate is available to libraries at \$11.00 per volume year for one regular and one bindery copy of each issue.

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Write to: Journal of Reading Behavior
College of Education
University of Georgia
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Albert J. Kingston

The Oscar S. Causey Award for Outstanding Achievement in College-Adult Reading

Remarks of Hazel Horn Carroll in presenting the 1968 Oscar S. Causey Award to Albert J. Kingston on behalf of National Reading Conference.

The 1968 recipient of the Oscar Causey Award is a pioneer in our organization. He has been in a guiding position since the beginning when he was a member of the Executive Committee. His service continued through the years and he is one of the distinguished past-presidents.

Other professional groups have benefitted from his contributions, also. Currently, he is Chairman of the Organization Committee of The International Reading Association, and has served as Chairman of the International Exchange Committee, as a member of the Timely Issues and Professional Standards and Ethics Committees of IRA.

He is a member of the Advisory Board of ERIC/CRIER and has served as a member of the Advisory Board of the *Journal of Read-*

ing. And since 1966 he has been a contributing Editor for *Research for the Classroom*.

The professional experiences of Albert J. Kingston, our member being honored tonight, have been enviably varied. They include such positions as:

Training Officer, U.S. Veterans Administration
Vocational Appraiser, Cornell University Guidance Center
Associate Professor of Psychology and Director of Remedial Reading, Agricultural and Mechanical College of Texas
Remedial Education and Reading Improvement Advisor, United States Operations Mission to Ethiopia, Addis Ababa
Remedial Specialist, Atlanta Public Schools, and
Professor of Education at the University of Georgia—his present position.

His preparation for such impressive assignments was done at New York State College for Teachers where he received his B.S. Degree and Cornell University where he earned the M.S. and Ph.D. Degrees.

The textbooks he has written are widely read and used. One of these, *Educational Psychology* (N.Y.C.: Appleton-Century-Crofts, 1964) was co-authored with Karl C. Garrison and Arthur S. McDonald, the 1967 recipient of the Oscar S. Causey Award. Another is *The Psychology of Childhood* (with Karl C. Garrison and Harold W. Bernard) N.Y.C.: Charles Scribner's Sons, 1967.

His other publications of workbooks, yearbooks and articles are too numerous to mention. They are so numerous that a graduate student said to me the other day, "I wish I knew what Albert Kingston looks like since I have to read so many things he has written."

These unusually diverse and rich experiences have been a launching pad for Albert Kingston and have sent him to impressive heights to orbit.

He is still young enough to continue in orbit, collecting data, and contributing data.

His contributions from his lofty position in outer and upper space have been pointing the way to better educational achievement. They will continue to make possible greater conquests in our profession, I am sure.

For outstanding contributions to our organization and to our profession, it is appropriate for him to receive this Award, and it is most pleasant for me to be the one to hand the 1968 Oscar S. Causey Award to Albert J. Kingston.



Oscar S. Causey

The Uses and Limitations of Eye-Movement Studies of Reading

Miles A. Tinker

Santa Barbara, California

Since the early work of Erdmann and Dodge (2), eye-mounted records have been employed more and more as measures of reading performance, especially during the last 50 years. The purpose of this paper is to point out some of the uses and limitations of eye-movement records as measures of reading performance. Although not much of the literature will be cited, statements in this paper will be based upon research studies in the field (see Tinker, 5).

As an introduction to our subject, I will cite a few fundamentals needed for an understanding of the experimental results on eye movements in reading. The first report on this subject appeared in 1879. It was made by Emile Javal (3) who noted that the eyes made quick jerks (saccadic movements) along a line of print with a pause after each movement. The next important series of experiments was published in 1898 by Erdmann and Dodge (2), in which they studied various aspects of eye movements without modern techniques for recording. Soon after the turn of the century there was a rapid increase in the study of eye movements in reading, first at Clark University and a little later at the University of Chicago where they employed Dodge's corneal reflection method of recording (1). Later centers for this work were located at the University of Minnesota and at Stanford and the University of Iowa and other laboratories.

The eye-movement measures usually employed in studying reading follow: frequency of fixation pauses along a line of print; the inter-fixation saccadic movements which are very rapid; pause duration, or the amount of time the eyes stop on each of the pauses; regressions, which are backward movements to the left, to reread or clarify something that has been read; perception time which is the sum of the pause durations; and the backsweep from the end of a line to the beginning of the next one.

The time taken by eye movements in reading is relatively a small percentage of the reading time, about 6 per cent on the average. These saccadic movements are so rapid that no clear vision is possible. This can easily be checked by looking into a mirror. Look at the image of one eye, then the other, back and forth. You will not be able to see any movement of your eyes, although you know they have moved. The pauses take up about 94 per cent of the reading time. There is a little variation in these two figures according to the nature

of the material being read. But the movement time is never greater than 10 per cent, and the pause time never less than 90 per cent of the reading time. The pauses are, of course, the times when reading occurs. So the sum of the pause durations is the perception time.

The relationship between the different eye-movement measures has been determined. Fixation frequency correlates about .82 with perception time; perception time with pause duration, about .52; perception time with regression frequency, about .60; fixation frequency with pause duration, about .03; fixation frequency with regression frequency, about .72; and pause duration with regression frequency, about -.07 (Tinker and Frandsen, 6). When perception time is compared with speed of reading comparable material, the relationship is .90. This is high and indicates that the eye-movement measure of perception time is about the same as speed of reading.

Eye-movement records are both reliable and valid measures of speed of reading. But neither valid nor reliable eye-movement measures can be obtained from reading a sample of only 50 words or 5 to 6 lines of print. Tinker's investigations (4) at the University of Minnesota revealed that at least 20 lines of print must be read to obtain a reliable measure of eye movements ($r=.80$ to $.90$ between two forms of the material).

Validity has been obtained by correlating the eye-movement measures with a criterion. In the early studies the eye-movement records for reading one type of material were correlated with test scores on an entirely different kind of reading material. This is an unsatisfactory method since we know from research that the correlation for reading different kinds of material is insignificantly low. One should use material for the criterion that is strictly comparable to that used for the eye-movement records. When this is done, validity coefficients of .80 to .99 are obtained except for pause duration.

Does reading before the camera, which is done in most eye-movement studies, yield the same results as when reading at a table which is a natural reading situation? According to Tinker's results (4), the answer is yes.

Now we may turn to the fundamental oculomotor behavior of the eyes in reading. A sampling of typical results will be cited. First let us emphasize that the eye-movement technique is essentially a research technique that has been employed to good advantage in reading research. Studies have shown that eye-movement patterns change as one progresses from grade one up through the college level. From grade one through grade four there is a rapid decrease in fixation and regression frequency, and pause duration. Then the decrease from grade four to eighth or ninth is slow. At still higher levels there are few changes.

In comparing efficient with inefficient readers it has been demonstrated that the efficient reader makes fewer fixations and regressions and shorter pauses than the poor reader. It has also been shown that eye-movement patterns vary according to the kind and difficulty of the material read.

In a relatively large number of reading situations, the oculomotor behavior has been studied to get at the nature of the reading. Included are the following: reading proof; reading a foreign language; studying spelling; reading while typing; reading formulas and numerals; reading objective examination questions, and others.

Eye-movement measures have been and continue to be used in clinics and classrooms. Workers in these situations, many with an inadequate knowledge of the psychology of reading, have assumed that the eye-movement technique is very useful for diagnosing reading difficulties and for checking improvement after training. First, it is well to emphasize again that the study of oculomotor behavior in reading is a very good technique for research in the field of reading. From research that has been published we know the kind of eye movements that a disabled reader makes. There is no need, therefore, to spend several hundred dollars for a device to photograph eye movements of the clinic case and to have specialized individuals to interpret the records. This means that there is no need to use eye-movement recording in the clinic or the classroom. It is better to dispense with this technique and to use standard methods for diagnosing and treating reading disability cases.

It was discovered early that the effective reader makes few fixations and regressions in reading. This finding led to the devising of several techniques for training eye movements. It was assumed that, if the poor reader was trained to make fewer fixations and regressions per line, his reading would automatically improve. Unfortunately, this presumes that external motor factors are going to operate in bringing about the change in reading performance rather than the more important central factors of perception, comprehension, and assimilation of material.

With these devices available, it has been difficult to persuade clinicians and teachers to let the machines alone and go ahead with regular and valid procedures of training. Several experiments have demonstrated that pacing eye movements, with or without special apparatus, is no more effective for improving reading than well motivated library or classroom practice. It is better, therefore, to forget about training eye movements and emphasize the more important factors mentioned above.

Research has demonstrated in a convincing way that eye movements are not causes but merely symptoms of reading proficiency. Again it may be emphasized that the teacher and clinician can go

ahead with their work and forget about eye movements as such. It is important, however, that they know about eye movements in reading, which merely reveal what is going on in the central processes of perception and comprehension.

Two other items should be mentioned. In oral reading, an important factor is the eye-voice span in which the eyes may be several words ahead of the voice. This span may be zero (looking at the word as it is spoken) to seven or eight words. The latter occurs with effective oral readers. The eye-voice span permits proper phrasing, attention to punctuation, and contact with the audience by occasionally glancing up from the reading.

Eye movements have aided the study of legibility of print. For instance, compare reading six point type with eleven point type which is best for adults. The six point is read significantly more slowly than the eleven point when each is set in maximal typographical arrangement. Eye-movement records are used to find out what causes the slower reading of the six point type. The smaller type is read with significantly more fixations and regressions, and a longer pause duration. Similarly, other differences in typographical arrangements were investigated by the eye-movement technique. While a proper reading test will show which printed arrangements are read fastest or slowest, the oculomotor behavior shows the basis for the variation in speed.

Eye movements are closely related to speed of reading. As already noted, the fast reader makes fewer fixations and regressions and briefer pause durations.

A perennial question among school teachers, parents, business executives, and others is: How fast can one or should one read? Commercial outfits throughout the country are capitalizing on this interest. Extravagant claims are made about how fast particular programs can get one to read: 1200 words per minute, 10,000, and even 20,000 words per minute.

Actually, practically everyone can learn to read faster than he ordinarily does. Experiments show that on the average one may expect a 20 to 50 per cent gain with a moderate amount of practice. In individual cases the gains may be zero or up to about 200 per cent.

The best way to begin a program for increasing speed is first to remove causes of slow reading: too small a sight vocabulary, weakness in vocabulary knowledge and comprehension; word recognition difficulties; overanalysis; insufficient use of context; lack of phrasing; and vocalization.

How fast can a person learn to read with comprehension? There is no unequivocal answer, for speed is affected by purpose of reading, kind of material read, and its difficulty. But with fairly easy material read for the general idea, 400 words per minute is very fast for a seventh grader, while for able college students, 600 words per minute

is very fast and 850 words per minute is exceedingly rare. It is not uncommon for educated adults to reach rates of 500 to 600 words per minute. These are rates for superior students.

To read most of the words on a page, the limit is 800 to 900 words per minute. If rates of 1200 to 1500 or more words per minute are reported, they refer to partial reading or skimming. Any statement that 10,000 to 20,000 words per minute are read is unrealistic. Words cannot be seen that fast. Therefore reports that 10, 15, or 20 thousand words per minute are read are just not true. Rather it is a special form of skimming.

Conclusions: Be cautious about the interpretation of eye-movement measures in reading and about accepting claims of speed reading in commercial programs.

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The Psychology of Reading Behavior

Paul Conrad Berg

University of South Carolina

Organizations, like people, have birthdays. The National Reading Conference has reached the rather significant age of eighteen, presenting to its long time friends a suitable occasion to pause for reminiscence and a bit of nostalgia. The Conference, if indeed it can be said to parallel Shakespeare's seven ages of man, should have come to the age "Full of strange oaths, bearded, and sudden and quick in quarrel."

How has the reading profession, our own conference reflecting this growth, developed toward a comprehensive psychology of reading behavior as compared to the fragmented practices of the late forties and early fifties? I should like to recall a few selected studies and practices in reading that have claimed our attention over this period of time only to illustrate a point of view, and I will attempt a summary of sorts that hopefully will offer a rationale to my suggestions or recommendations for taking a new look at our field as a behavioral science.

In 1955, the Southwest Reading Conference, as we were then known, published selected proceedings from its first conferences. A summary of these conferences stated that "The first three meetings were concerned with practical problems: how to use the tachistoscope, the use of reading accelerators, etc. Research was not excluded, however, and increased in importance in the successive programs." (14)

A general review of the literature around the early fifties indicated that rate training was of major interest, based on such studies as those of Renshaw of Ohio State. In one study of three college students who had worked with digits on the near-point tachistoscope, Renshaw stated that "the protocols of the students contained clear and unambiguous testimony to the fact that reading and understanding what was read was easier and surer after training." Therefore he concluded that "tachistoscopic training with digits . . . will produce significant increases in reading comprehension, and because of this, in speed." (10) This concept had an important influence on reading training for college students and adults, it being commonly held by many that widening the span of perception while shortening the exposure time by tachistoscopic methods had direct transfer to speed and comprehension of reading. Continuing investigations through the fifties and early sixties, while indicating that there is interaction between the

* Appreciation is given Mr. John George of the Reading Clinic and Dr. George Lackey of Educational Research for their help in organizing the ideas presented in this paper.

oculomotor processes and the mental processes during reading, did not prove a cause-effect relationship between them. However, the idea persisted, and adding to it the hardware for training that grew up around the idea, many programs continued a commitment to the mechanical training aspects of the reading process.

Overlapping in time, but drawing less attention because of the undramatic nature of the work, were studies of a more fundamental nature relating to comprehension in reading. Earlier studies by Thorndike (13) in 1917 on reading as reasoning and the first factorial studies of comprehension in reading by Davis in 1941 (3) indicated that reading behavior was related to the psychological aspects of reasoning as well as to the ocular and mechanical. Of the nine variables hypothesized by Davis, five were found to meet his criteria for stability and order as variables. These factors were "knowledge of word meanings," "verbal reasoning," "sensitivity to implications," "following the structure of a passage," and "recognizing the literary techniques of the writer."

Lyman Hunt (8) and Alshan (1) in 1964 also attempted factor analysis of reading comprehension, each using test items from the Davis studies to build his research instrument. Hunt concluded from his results that only two skills in comprehension were factorially defensible—word knowledge and paragraph comprehension. Alshan was also unable to substantiate the hypothesis that five different skills of comprehension were independently factorable from the Davis items.

In 1966 Davis again attempted a factorial study of reading comprehension, using a much improved statistical technique of cross-validating uniqueness analysis based on a sample of 1,100 high school seniors in the Philadelphia area. This study is reported in the summer 1968 issue of the *Reading Research Quarterly*. Eight separate skills were selected for study after an analysis of previous research, including the Davis, Hunt, and Alshan studies. Five skills were found to be significant. The skill making up the largest percentage of variance was "memory for word meanings" with 32 per cent of the total variance. Next, and in order, were

drawing inferences from the content—20 per cent of the variance; following the structure of a passage—14 per cent of the variance; recognizing a writer's purpose, attitude, tone and mood—11 per cent of the variance; and finding answers to questions asked explicitly or in paraphrase—10 per cent of the variance. (4)

These five skills made up 87 per cent of the total variance of the eight variables studied by Davis.

This work on comprehension is illustrative of the many studies that attempted to explain or define the factors of language and to show their interrelationships within the reading act. The taxonomic activ-

ity during this period included studies on the size of the essential vocabulary at various age and grade levels; the earlier work of Thorndike on the frequency count of individual words in published materials; studies extending from the 1920's on the number of Latin and Greek derivations in English; and within the last few years, the application of the Cloze procedure to identify the relative difficulty of word lengths and form classes in continuous prose.

While any generalization about thousands of relatively unrelated studies made over a fifty year period in reading is presumptuous, I would like to suggest that many if not most of the studies which preceded the late fifties and early sixties were taxonomic; that is, their major purpose was to put in order or classify the parts and pieces of the many elements that make up reading, as illustrated by the types of studies mentioned. Technically, taxonomic studies report a status quo, how things are, not how things ought to be. They represent the first step of a science; they are not the science itself. A science enables man to predict, control, and offer increasingly accurate explanations about the world around him. Without prediction there can be no control, and without prediction and the possibility of control, explanation is meaningless. Obviously, the better our explanations or theories, the more sensitive we can make our predictions and the more complete our control. While taxonomic research does provide us with notions upon which we make predictions, they are at best elementary and produce a control that is gross. Our attempts at explanations are *ex post facto* to our individual findings and therefore often contradictory. Phillip Frank, professor of theoretical physics at the University of Prague and MIT and noted author in the physical sciences, states:

It is very important to keep in mind that science is not a collection of facts. No science is built up in this way. A collection of statements indicating on what days snow has fallen on Los Angeles is no science. We have science only when we can set up principles from which we can derive on which days snow will fall on Los Angeles. . . . If the principles are as complicated as the facts themselves, they do not constitute a science. The mere observation of the positions of the planets in the sky is no science. Ancient scientists attempted to set up curves which would describe this motion. These were once thought to be circles; they were later thought to be ellipses, but this is only true if perturbations are neglected. Considering perturbations, the equations of those curves are very complicated—there are so many terms that they could fill a volume of a hundred pages. This is just as complicated as recording all the positions of the planets. It gives us no advantage; nor is there any science in it. If

there is not a small number of principles, if there is no simplicity, there is no science. The scientist is often accused of oversimplifying. This is true; there is no science without oversimplification. The work of the scientist consists in finding simple formulae. (6)

Although Frank's observations would make it appear that methodology cannot be created from observations about behavior alone, it is clear that in the field of applied sciences taxonomic studies can lead to some degree of prediction and control. In some instances we can point to obvious evidence of this, as indicated by the application of the Renshaw observations of perception to a method of training the eyes for rapid reading. B. F. Skinner, for example, observed that behavior in animals is shaped by a response-reinforcement patterning or programming of activities. Largely from these studies, there are presently materials for programming human behavior in reading and other areas. Predicting human behavior on the basis of animal behavior is not new, but it complicates the jump from "is" to "ought to" even further. Would the method of programming, for example, be different had a theoretical model of learning been built and the hypotheses stemming from it tested on humans instead of animals? Is the releasing of corn by a pigeon a parallel to learning to read by a human? Who says, for example, that the programmed materials that have sprung up to teach children how to read really contain a breakdown of the subject into its smallest possible component strands and these in turn arranged in proper sequence? Even if we could agree on the breakdown and its sequencing, who is to say that one child learns as parsimoniously as another by the same size steps? While we talk about branching programming to take care of a sufficient and necessary number of steps for all children, how many programs do you know of that have an effective branching system?

Another argument to rationalize our techniques in teaching might be that many of the methods and materials that we have and use have grown out of a philosophy about reading and do not require further proof than the fact that they work. It must be admitted that some of our most advertised and used materials today, in fact, are not the result of tested theoretical positions. Some researchers would state that this period has not produced methods and materials that are significantly more scientific than the *a priori* pronouncements prior to the research of this period.

For example, in 1911 Laycock and Russell reported that an "analysis of (reading improvement) manuals reveals that few of them have any basis in research findings for their suggestions regarding improvement." (9) While the finding of this early study is perhaps not surprising, in 1950 Robinson made the same charge relative to college reading manuals when he stated: "No particular professional acuity is

required to penetrate the superficiality of the types of exercises and treatments that characterize most of these volumes." (11) On this end of the twenty-five year period, Davis, commenting on his factorial findings states: "Unfortunately, learning materials of the types required have not been written, tried out experimentally, and assembled in convenient units. Clearly, self-teaching exercises of these types should now be prepared and published for secondary-school use." (4)

To this point in our discussion it is implied that most of the studies predating the 1960's were basically taxonomic in intent and did not produce a great deal in terms of unifying theories from which heuristic hypotheses could be generated. To the extent that this is true, it limits the degree to which a body of generalizations and principles can be scientifically developed in association with practice helping to create for reading instruction a content as an intellectual discipline.

In the late fifties with the publishing of *The Nature of Reading Disability* by Donald Smith and Patricia Carrigan (12), the appearance of *The Treatment and Prevention of Reading Problems* by Delacato (5) in the same year, and the research of Jack Holmes (7), and others, another type of research began to gain in importance. These studies had this in common. They attempted to go beyond a taxonomic model and develop a theoretical position offering an explanation as to why certain observed behavior took place. Holmes (7), by administering a selection of tests of skills used in reading, created, by a multiple correlation technique, a hierarchy of substrata factors at successive levels. This taxonomy of reading skills was then hypothesized as representing a kind of homolograph of phase sequences and cell assemblies with their multiple and reciprocal connections in the brain. Smith and Carrigan (12) hypothesized that observed dysfunctions in reading had their point of locus in faulty synaptic transmissions due to chemical imbalances, and Delacato (5) theorized that lack of neurological organization at any point in the developmental scale would produce an associated defect in reading.

While each of these attempts to explain reading behavior and through the explanation to develop a logical and heuristic framework for continued research and methods-building has met with various criticisms, the simple fact is that without a more pervasive theoretical structure we can never really develop an orderly system of data collecting or finally regularize the discipline into a science. My own opinion of the models mentioned is that they are hardly an oversimplified theoretical extension of the real world. It seems to me that they are fully as complicated as what they try to explain, aside from the fact that they are somewhat tenuous.

But without being able to view the parts in relation to some theoretical conceptual model or models, we shall continue to be like

the four blind men perceiving an elephant. The man who holds the elephant's leg says that it is very much like a tree, while the man who feels the elephant's side says, "ridiculous—an elephant is very much like a wall." Their problem? Within their particular framework they are both right, but their predictions will be faulty and their control will be poor. They have no framework in which both elements of the perceived phenomenon can be accounted for. In other words, they have no adequate explanation. Their several biases are the product of where they stand—any theory of reading presently available is created through the biases of the position of the theoretician. The gestaltists, for example, are interested in the mediating processes of the human mind, the social psychologist in environment, the biological conceptualists in cell assemblies and other miscellaneous neurological models, and the SR people say, "you can't see what's going on in the mind so let's concern ourselves with overt behavior that can be observed and quantified."

Isaiah Berlin (2), discussing Tolstoy's theory of history as expressed in *War and Peace*, stated that Tolstoy was of the opinion that no unified theory of human events is possible because they are determined by a multiplicity of individual action, incapable of having a clear focus. Perhaps this is right and proper. Maybe each man must do his thing, and surely the democratic process regards individual initiative above a system that dictates theory from the top down. But even in a democracy, scholars engaged in a scientific endeavor that is of universal interest and urgency pool their resources and individual contributions toward the common goal. There must be very few backyard scientists that are going it alone in an attempt to reach the moon. All interested parties apply their know-how and creative effort through NASA. And this raises an important point—what single man, for example, could have made an atom bomb? Yet an interior decorator contributed to its creation by advancing the idea for the barrier that separated the volatile matter within the warhead. He was able to do this because the network of research that made up the Manhattan Project was able to search out and use his help. The Polaris missile system was the first clear application of PERT, or Program, Evaluation, Review Technique. Through its massive pooling of previous research, and its complex intercommunication system it was able to develop each of its several sub-systems (guidance, engines, air-frame, etc.) into a total system with the aid of 3,000 contractors and cut off three years from its estimated completion.

Scientists in reading, however, tend to go it mostly alone; yet the discipline with which they deal is surely as important and urgent for solution as the needs of the military. And, more importantly, in my opinion, they have gone about as far as they can alone. Even in reading, it would appear that industry is fast gaining a monopoly on

the methods and materials of teaching, and while it employs professionals and scholars as consultants to its programs, its purpose is not so much the development of theory as it is the more immediately utilitarian and productive models for materials.

Can there be, or indeed should there be, an amassing of brain power toward a crash program to finally come up with heuristic theories about the nature of adult reading that can act as a pervasive guide to the hundreds of research studies turned out yearly? Adding to the work of such a task force is the potential of hundreds of graduate students from our universities who could elect to join the undertaking. This approach to thesis projects could be as creative and independent in terms of the student's selection of the project *per se* and his handling of it as is the present technique of guidance used by a student's major professor.

Since no one can observe everything at once, theoretical models developed by such an organized task force of interested researchers can give guidance in what to observe and make communication about what is observed more explicit and universally understood. Such models would act as criteria for both selecting variables and helping to eliminate those not consistent with the assumptions or that overly complicate rather than simplify the intent of the theory. Such action, hopefully, could produce a psychology of reading behavior. Such organized action is the difference between research and development as opposed to research alone. There are at least four references that you may wish to read if you care to look into this idea further; although only one deals with reading *per se*, all of them indicate something of the general need in education for the research and development concept, and the *Saturday Review* article in particular discusses what is presently being done in cooperative research in other areas of education:

Bloom, Benjamin S., "Learning for Mastery," *U.C.L.A. Evaluation Comment*, May, 1968.

Dunn, Lloyd M., "Is Much of Special Education Obsolete?"

Ray Graham Memorial Address, October 14, 1967, 18th Annual Convention of the Illinois Council for Exceptional Children.

Koerner, James D., "EDC: General Motors of Curriculum Reform," *Saturday Review*, August 19, 1967.

Wiener, M. and Cromer, W., "Reading and Reading Difficulty: A Conceptual Analysis," *Harvard Educational Review*, 37 (Fall, 1967,) 620-43.

At no previous time has the opportunity for such a mass approach been as possible as today. The selection of related research from the past has been greatly simplified by ERIC/CRIER, and the modern

computer with its almost unlimited programming possibilities does in a few minutes what it took us months or years to do twenty years ago. We have the machinery and we have the brains. The machines are ready to go. Who is waiting to act as organization chairman for the human equation?

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Cloze Residual Gain -- A Technique for Measuring Learning Through Reading

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The purpose of this study was to investigate a new method for measuring reading skill. Normal methods of measuring reading comprehension utilize a test administered after reading is completed. Since different individuals approach the reading situation with varying amounts of pre-knowledge concerning the topic of a printed message, the results of a comprehension test administered after reading reflect a combination of knowledge possessed before reading plus information gained while reading. The use of the cloze residual gain technique should separate the amount of knowledge learned by reading from that known prior to reading.

Such a measurement technique has important implications for research. It should enable us to look at reading as a learning process rather than a final product. Much new research should be generated on variables related to reading as a learning process. Thus, reading research might become more closely integrated with psychological studies of learning. Research designs could use cloze residual gain as either an independent or a dependent variable. This technique should generate both new hypotheses and new methods of testing old hypotheses.

Cloze residual gain brings together the "cloze procedure" (a method for measuring the effectiveness of communication) and "residual gain" (a statistical method for measuring individual differences in improvement). The cloze procedure was created by Wilton Taylor (1954) to measure the degree to which a message could be communicated effectively between a message source and a receiver. In written form, a cloze test is produced by mechanically deleting words from a written passage and instructing the subject to fill in the missing blanks by utilizing the clues available in the remaining context. Rankin (1957) and Jenkinson (1957) first demonstrated the validity of the cloze procedure as a measure of reading comprehension by correlating cloze results with standardized reading tests.

The cloze procedure can be used to measure the amount of information gained through reading by administering a pre-reading cloze test, having the subject then read an article, and, finally, administering a post-reading cloze test. The difference between the pre- and post-test is a measure of gain in comprehension. Both Taylor (1957) and Rankin (1957) have found that cloze tests are a valid

measure of both pre- and post-reading knowledge and that reading an article produces a highly significant difference between pre- and post-reading test results. However, Greene (1964) and Coleman and Miller (1968) failed to find significant differences between pre- and post-reading cloze tests taken by different subjects. The reason for these conflicting findings is not clear. Rankin (1957) found significant pre- post-reading cloze gains both for the same subjects taking different cloze test forms and with a matched group designed similar to that used by Greene and Coleman and Miller (i.e., one group took the pre-cloze test only; the other group read the article and took the post-cloze test). Taylor (1954) even found that reading an article influenced cloze test results six weeks later.

As Rankin (1964) has previously pointed out, Greene's results were based upon groups that had not been matched for reading ability. Coleman and Miller's results were based on subjects who read the 150 word article with a 60 second time limit and who took the cloze test with a six minute time limit. It may be that these time limits reduced the amount of learning that might otherwise have taken place during reading and also the opportunity for learning to be reflected on the post-reading cloze test. However, Coleman and Miller jumped to the conclusion that cloze tests were not sensitive to gain measurement in apparent ignorance of the previous work that had been done on this topic and without due regard to the possible limitations of their experimental design.

In the writer's opinion, cloze tests are valid measures of group differences in gains attributable to learning through reading. However, Rankin (1966) has observed that cloze reading gains do not correlate with other criteria such as tests of knowledge or reading comprehension. Accordingly, doubt exists as to the meaning of individual differences in gains thus measured. Rankin (1965) has suggested the use of residual gain in the study of individual differences in cloze test reading gains.

The customary method of measuring gain has been to administer a pre-test and, at some later time following a learning experience, to administer a post-test. The difference between pre- and post-tests is called "crude gain." Several disadvantages exist in using crude gain measurements. Manning and DuBois (1962) state that the use of crude gains is based on the assumption that pre- and post-measurements are expressed in identical interval scales with equal increments in scores and with the same zero point. Most educational and psychological tests do not meet these assumptions. Furthermore, regression effects usually distort individual differences in crude gain measurements, and a spurious correlation (usually negative) exists between the initial status on the pre-test and crude gains. Finally, psychological research on correlates of crude gains has not been fruitful.

Manning and DuBois (1962) have devised a technique called residual gain as a measure of individual differences in improvement. This technique does not possess any of the previously mentioned limitations of crude gain. Residual gains may be defined as the deviation of a subject's post-test score from the post-test score that was predicted from his pre-test score, or the deviation of scores from the regression line of final on initial scores. The residual gain formula is expressed as:

$$\text{Residual gain} = z_2 - r_{12}z_1$$

where z_2 is the post-score in z-score form, r_{12} is the correlation between pre- and post-tests, and z_1 is the pre-test score in z-score form. By the use of this technique, subjects are statistically equated with respect to initial status on the pre-test, and the correlation between residual gain and initial status is zero.

Rankin and Tracy (1965) have shown the value of residual gain measurements in the study of individual differences in reading improvement resulting from training. Another paper by Tracy and Rankin (1967) has presented simple graphical techniques for determining and interpreting residual gains in reading without a large amount of statistical calculation.

The purpose of this study was to investigate the application of the residual gain technique to reading gains as measured by the cloze procedure. Comparisons were made between cloze crude gains and cloze residual gains and between cloze tests constructed with "lexical" versus "structural" deletions—see Rankin (1959). Correlations of gains with a multiple-choice knowledge test and with the *Davis Reading Test* were studied.

The hypotheses tested were these:

1. The pre-cloze test is a valid measure of pre-reading knowledge.
2. The post-cloze test is a valid measure of post-reading knowledge.
3. There is a significant difference between pre- and post-cloze test means.
4. There is a significant correlation between crude and residual gains.
5. There is a negative correlation between initial status on the pre-test and crude gain.
6. There is no significant correlation between crude gains and criteria tests.
7. There is a significant correlation between residual gains and criteria tests.

METHOD

Subjects.—Two semester's classes of both male and female subjects enrolled in the Developmental Reading Program at Texas Christian University were used. The five classes of the Fall 1966 semester totaled

108 students; these students were given the structurally cloze test. The 66 students enrolled for the Spring 1967 semester were given the lexical cloze test.

Materials.—The materials used were a multiple-choice test of comprehension and two cloze tests containing three samples derived from an article concerning temperature found in the *Diagnostic Reading Tests: Section III: Rates of Reading, Part 3: Science*. The readability score for the article was measured through the use of the Flesch Formula and found to be 66 (i.e., standard difficulty).

The materials consisted of the undeleted passage, the cloze test passages, and multiple-choice comprehension test. The complete passage was presented only once, just prior to the giving of the post-cloze test. The multiple-choice test covering the passage was taken from Rankin's (1957) dissertation.

Three samples taken from the article on temperature were used in both types of cloze tests. The structural cloze test was based on the deletion of every fifth word. Each of the three samples in the cloze test contained 34 deletions using every fifth word. Samples began with complete sentences, and deletions began with the fifth word of the first sentence in each sample. Each sample had a uniform length of 170 words and the whole cloze test contained a total of 102 deletions. The three samples chosen were taken from the beginning, middle, and end of the article. A constant length of ten letter spaces was provided in which the subject was to insert his answer or best guess as to the word deleted.

In the lexical cloze test the same three samples were used with the exception that only nouns and verbs were deleted. From the beginning of the first sentence, five words were counted and the nearest noun or verb was then deleted. Starting with and including the word immediately following, five more words were counted, and the procedure was repeated until 34 deletions per sample were found. The total number of deletions were 102 for this test also.

Procedures.—Each of the classes was tested as a whole on two occasions with the instructions for completing the cloze test being read aloud once after the materials had been handed out. Each class was divided evenly with half the class taking the cloze test first followed by the multiple-choice test. The other half of the class took these tests in reverse order. The counterbalancing was carried out to prevent possible order effects. During administration of the pre-tests, none of the students had access to the passage written without deletions.

The same students were tested for the second time after a thirty-day delay to allow for reduction of learning effects from the first testing session. The same tests and procedure as described above were employed except that each student was first allowed to read the

passage containing no deletions. When they had finished reading, the passage was taken up and the identical cloze and comprehension test were readministered.

The *David Reading Test* was administered to all subjects a few days after the second testing session.

RESULTS

To test hypotheses 1 and 2, Pearson correlations were computed between cloze tests and the multiple-choice criterion test. Guttman reliability coefficient for these tests was as follows: .80 and .74 for pre- and post-structural cloze tests; .84 and .82 for pre- and post-lexical cloze tests; .71 and .83 for pre- and post-multiple-choice tests. Since two of these reliability coefficients were marginal, all correlations were corrected for attenuation. These results are presented in Tables 1 and 2.

TABLE 1
CORRELATIONS BETWEEN PRE- AND POST-STRUCTURAL
CLOZE TESTS AND MULTIPLE CHOICE TEST

n=108	Correlation	Correlation Corrected for Attenuation
Pre-test	.42*	.56*
Post-test	.53*	.68*

*p < .01

TABLE 2
CORRELATIONS BETWEEN PRE- AND POST-LEXICAL
CLOZE TESTS AND MULTIPLE CHOICE TEST

n=66	Correlation	Correlation Corrected for Attenuation
Pre-test	.41*	.53*
Post-test	.60*	.73*

*p < .01

These results indicate that both structural and lexical cloze tests are reasonably valid measurements of pre- and post-reading knowledge. The post-test validity coefficient was somewhat higher than the pre-test coefficient.

Hypothesis 3 was tested by comparing pre- and post-cloze tests means for both structural and lexical tests. The results presented in Table 3 leave no doubt that cloze tests are a highly sensitive measure of reading gains.

Hypothesis 4 states that there is a significant correlation between crude and residual gains. As shown by Table 4, there is a very high

TABLE 3
MEAN GAIN BETWEEN PRE- AND POST-CLOZE TEST PERFORMANCE

Cloze Test	Pre-cloze Mean	Post-cloze Mean	Mean Gain	p
Structural (n=108)	51.2	63.7	12.5	18.94
Lexical (n=66)	43.5	64.9	21.4	20.38

TABLE 4
CORRELATIONS BETWEEN CRUDE GAIN AND RESIDUAL GAIN

Cloze Test	Correlation
Structural (n=108)	.95*
Lexical (n=66)	.86*

*p < .01

correlation between these two measures of gain. These results might seem to indicate that there is no substantial difference between the two statistical techniques. If the results are so similar, why go to all the trouble to measure residual gain? However, Rankin and Tracy (1965) obtained results which shed some light on this problem. They found that grades assigned for improvement in a college reading course on the basis of both crude and residual gains tended to be in greater agreement in the middle of the distribution than at either extreme. In view of this finding, a comparison was made, by the present writers, of T-Scores assigned to residual versus crude cloze gains. Mean T-Scores were computed for the top 25%, middle 50%, and bottom 25% of the gain distribution. These data are presented in Tables 5 and 6.

TABLE 5
MEAN T-SCORES FOR CRUDE AND RESIDUAL GAIN ON STRUCTURAL CLOZE TEST IN RELATION TO RANK IN DISTRIBUTION

Rank	Residual Gain	Crude Gain	Difference
Top 25%	57.6	60.4	2.8
Middle 50%	50.4	50.1	.3
Bottom 25%	41.1	40.0	1.1

TABLE 6
MEAN T-SCORES FOR CRUDE AND RESIDUAL GAIN ON LEXICAL CLOZE TEST IN RELATION TO RANK IN DISTRIBUTION

Rank	Residual Gain	Crude Gain	Difference
Top 25%	58.8	62.1	3.3
Middle 50%	50.6	49.8	.8
Bottom 25%	39.8	37.8	2.0

This evidence indicates that the greatest difference between T-Scores based on residual versus crude cloze gains is found in the upper and lower portions of the distribution. Thus, despite the high correlation between the two measures of gain, the use of residual gain may still be justified. More evidence bearing on this conclusion will be presented subsequently.

Manning and DuBois (1962) maintain that correlations between initial status (i.e., relative position on the pre-test distribution) and crude gain tend to be negative. They view these negative correlations as a statistical artifact rather than an actual tendency for subjects at the low end of the pre-test distribution to actually show more improvement than those near the top of the distribution. The correlation between initial status and residual gain is zero by definition. The negative correlation in Table 7 between initial status and cloze crude gain confirms hypothesis 5 in accordance with expectations stemming from the work of Manning and DuBois. The $-.01$ correlations between initial status and residual gains may be accounted for by rounding errors. The lack of any relationship between initial status and residual gain shows that this technique serves to equate statistically on the pre-test. This is one of the principle reasons that residual cloze gains are to be preferred over crude cloze gains for measuring learning through reading.

Evidence related to hypotheses 6 and 7 is presented in Tables 8, 9, and 10.

It was predicted that there would be no significant correlation between crude gains and criteria tests. For the multiple-choice post-

TABLE 7
CORRELATION BETWEEN INITIAL STATUS AND GAIN

Cloze Test	Crude Gain	Residual Gain
Structural (n=108)	— $.32^*$	— $.01$
Lexical (n=66)	— $.50^*$	— $.01$

* $p < .01$

TABLE 8
CORRELATIONS BETWEEN GAIN SCORES AND MULTIPLE CHOICE TEST

Gain	Cloze Test	
	Structural (n=108)	Lexical (n=66)
Residual	$.28^*$	$.38^*$
Crude	— $.02$	$.08$

* $p < .01$

TABLE 9
CORRELATIONS BETWEEN GAIN SCORES AND
DAVIS LEVEL OF COMPREHENSION SCORES

Gain	Cloze Test	
	Structural (n=108)	Lexical (n=66)
Residual	.32*	.02
Crude	.14	-.35*

*p < .01

TABLE 10
CORRELATIONS BETWEEN GAIN SCORES AND
DAVIS SPEED OF COMPREHENSION SCORES

Gain	Cloze Test	
	Structural (n=108)	Lexical (n=66)
Residual	.36*	.00
Crude	.17	-.33*

*p < .01

reading test, the hypothesis was confirmed. For the *Davis Reading Test*, the prediction was confirmed for the structural crude gains but not the lexical crude gains. The lexical crude gains correlated negatively with the *Davis Reading Test* (i.e., -.35 and -.33 for Level of Comprehension and Speed of Comprehension, respectively). The reason for this is not clear. In any case, it is clear that cloze gain scores as measured by crude gains do not bear any meaningful relationship with either tests of specific knowledge or with standardized reading tests.

On the other hand, the structural cloze residual gains bear a low but significant relationship with the *Davis Reading Test*. This low correlation is desirable since one would expect some relationship between a measure of learning through reading and a post-test which reflects, in part, the same thing plus what was known prior to reading. However, a high correlation would not be either expected or desired if cloze residual gain has any unique contribution to make as a testing technique.

Results from Rankin's (1957) study showing the closer relationship between lexical cloze scores and specific knowledge tests and the higher relationship between structural cloze scores and standardized reading tests led to the expectation that lexical cloze residual gain scores would correlate more highly with the post-multiple-choice criterion test than with the Davis test. Also, it was anticipated that the structural residual gain scores would correlate more highly with the Davis test than with the multiple-choice test.

As seen in Tables 8, 9, and 10, lexical results confirmed this prediction. The correlation of .38 between lexical cloze residual gain and the multiple-choice test compares with correlations of .02 and .00 with the Davis test. The structural cloze residual gain correlations of .32 and .36 with the Davis test was slightly higher than the comparable correlation of .28 with the multiple-choice test. However, this difference is probably not significant.

SUMMARY AND CONCLUSIONS

The following conclusions may be drawn from this investigation:

1. The cloze test is a valid measure of pre- and post-reading knowledge.
2. The cloze test is a highly sensitive measure of reading gain.
3. Although crude and residual cloze gains are highly correlated, the use of the residual gain technique is still justified.
4. There is a significant negative correlation between initial status and cloze crude gains but no correlation between initial status and cloze residual gain.
5. Crude cloze residual gains do not bear a meaningful relationship to either tests of post-reading knowledge or standardized reading tests.
6. Structural cloze residual gains bear a desirable low but significant correlation with both tests of post-reading knowledge and standardized reading tests.
7. Lexical cloze residual gains are related to tests of post-reading knowledge but not to standardized reading tests.

Cloze residual gain offers a new dimension to the measurement of reading ability. It clearly measures individual differences in learning through reading, uncontaminated by differential pre-knowledge on the part of readers. Cloze tests are easy to construct and administer, and recent advancements in the use of graphical methods of determining residual gain considerably shorten the time and effort involved in using this statistical technique. Cloze residual gain should open new avenues for reading research.

A Note of Caution.—Cloze residual gain has been presented as a technique for measuring *individual differences* in reading skill, *not group differences*. Since residual gain scores are deviations of post-test scores from a regression line, it follows that the mean of a total distribution of residual gains will be zero, by definition.

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A Comparison of Individual Reading Improvement Scores on a Group of Community College Freshmen As Measured by the Crude Gain Method and the Residual Gain Method

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Most of the previous research investigating gains in reading over a designated period of time reports on two methods employed to measure group or individual reading improvement. The two methods appear to be very similar in their procedure, for both apply simple subtraction of pre-test scores from post-test scores. The first method of measuring reading gains subtracts the pre-test scores from the post-test scores and calls the differences between the two scores "crude gain". Symbolically, the formula representing crude gain is $\text{Crude gain} = X_2 - X_1$. The second method is based on the same principle of finding the difference between post-test and pre-test scores but expresses the gain as a percentage of the initial or pre-test scores and is therefore called "percent gain". Symbolically, percent gain is represented by the formula: $\text{Percent gain} = X_2 - X_1 / X_1$.

Furthermore, research on gains in reading shows that apparently negative correlations resulted between initial and final status in reading improvement when measured by either the crude gain method or the percent gain method as evidenced by Ranson (7), Bloomer (1), Kamman (3), Chansky and Bregman (2), Ramsey (5), and Schneyer (8.)

Reviewing crude gain studies, Manning and DuBois (4) observed that the negative correlations in these reading studies may simply reflect the spuriously negative correlation between initial status and crude gain. "These difficulties," commented Manning and DuBois, "which are encountered in measuring change by the absolute difference between two test scores, would probably be overcome if there were assurance that increments in scores on both initial and final test were equivalent, that the two tests have the same zero point, and the tests are valid and reliable at all levels of proficiency" (4, p. 290). These assumptions, however, will ordinarily not be tenable.

ORIGIN OF THE STUDY

This study began in an effort to overcome the conventional way of measuring reading gains of college freshmen and sophomores by either the crude gain or the percent gain method. This effort was also encouraged as well as stimulated by the observations that (1) students

whose scores were lower on the pre-tests made apparently greater gains as measured by the post-tests than did students with average and above average pre-test scores, and (2) students whose scores were higher on the pre-tests made apparently less progress as measured by the post-tests than did students with lower pre-test scores.

For example, a student with a lower pre-test score may achieve a crude gain of +10 units as measured by the post-test score minus the pre-test score, while, at the same time and on the same test, a student with a higher initial score may achieve +3 units of crude gain as measured by the post-test minus pre-test scores. It would then appear that according to Schneyer (9) poor readers are benefited more by reading training than are good readers. Such a statement seemed not only to contradict common sense but also to discredit psychological expectation.

PURPOSE OF THE STUDY

The purpose of this study was to compare reading gains made by 36 college freshmen as measured by the crude gain method and the residual gain method. The study raised the following questions:

1. Did the results of the individual reading gains made in vocabulary, comprehension, total reading, and reading rate as measured by the crude gain method differ when the same reading gains were measured by the residual gain method?

2. How did the position of the zero line or no-learning line affect individual reading gains in vocabulary, comprehension, total reading, and reading rate?

3. How did the position of the regression line affect the same gains made in the same sub-tests?

EVALUATIVE INSTRUMENT

This study used as a criterion measure before and after instruction the Nelson-Denny Reading Test, Revised, Form A and B. To compute crude gains as well as residual gains of the 36 college freshmen the raw scores of the Nelson-Denny Reading Test were used. Since the raw scores are free from concomitant considerations of norming samples, educational grade levels, age, and sex, they were used in preference to percentile norms and grade equivalent norms in order that all students would be on an equal basis.

To compute individual reading improvement by the crude gain method, students' pre-test scores were subtracted from their post-test scores, that is, the initial and the final status have been treated according to the formula: Crude gain = $X_2 - X_1$. Graphically, crude gain results were plotted against each other on the X and Y axes in relationship to the zero line, $y = x$. Considering residual gain statistics, both the computational and the graphical method were applied to determine individual gains in vocabulary, comprehension, total reading, and reading rate.

To compute residual gain, the raw score formula has been used (6): $Y \cdot X = Y - bX + C$, where X = pre-test score, Y = post-test score, $C = \bar{Y} - b\bar{X}$, $b = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum X^2 - (\sum X)^2}$, $\bar{Y}$ = post-test mean, and $\bar{X}$ = pre-test mean. Using the graphical method for estimating residual gain, the following formula has been applied: $Y' = bX + C$, where Y' = predicted post-test score, $b = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum X^2 - (\sum X)^2}$, X = any arbitrary pre-test score value, and $C = \bar{Y} - b\bar{X}$. The computational method shows the predicted regression and the residual gain of the post-test scores on the pre-test scores. The graphical method shows the regression line based on the data of the computational method for the post-test scores on the pre-test scores.

ASSESSMENT OF INDIVIDUAL READING GAINS

The assessment of individual reading gains on the Nelson-Denny sub-tests of the 36 college freshmen is presented by the computational method in Table 1 and the graphical method in Table 2, Figures 1 to 4.

The computational methods shows (1) the crude gains based on the simple differences between the pre-test and the post-test raw scores and (2) the residual gain method based on the predicted regressions of the post-test raw scores on the pre-test raw scores.

The graphical presentation of the crude gain method is based on $y = x$ which for the purpose of discussion is called the zero line or no-learning line as shown in Table 2, Fig. 1 to 4. Progress in student's proficiency is noted by a plus sign before the crude gain number and with its position on the graph above the zero line; no learning progress is indicated by ± 0 and with its position directly on the zero line; and failure of improvement is marked by a minus sign before the crude gain number and with its position below the zero line.

The graphical method of the residual gain procedure shows the regression line determined by its intercept and its slope. At any given value of X , the height of the regression line tells the average value of Y . Based on the linear regression formula $Y = a + bx$, where x is zero, y is equal to a which indicates where the line intercepts the $Y =$ axis, and b , the slope or regression coefficient, indicates how much Y changes with a unit change in x . A student's residual gain is found by locating the interesting lines on the graph for the student's X and Y scores. The meeting point of the intersecting lines falls on, above, or below the regression line. If the point which represents the student's performance falls directly on the line, the student has performed as predicted. If the point falls above the regression line, the distance between its position and the regression line indicates that the student's performance was higher than predicted on the basis of the pre-test score and a plus sign precedes the residual gain

TABLE 1: Computation of crude and residual gain of individual student reading improvement

Students	Nelson-Denny sub-tests	Pre-raw scores	Post-raw Scores	Crude Gain	Regression of post-test on pre-test	
					Predicted	Residual gain
1	V	10	14	+ 4	17.105	— 3.105
	C	16	26	+ 10	33.287	— 7.287
	T.R.	26	40	+ 14	49.347	— 9.347
	R.R.	150	226	+ 76	369.493	—143.493
2	V	11	16	+ 5	18.144	— 2.144
	C	16	30	+ 14	33.287	— 3.287
	T.R.	27	46	+ 19	50.135	— 4.135
	R.R.	150	195	+ 45	369.493	—174.493
3	V	11	10	— 1	18.144	— 8.144
	C	16	38	+ 22	33.287	+ 4.712
	T.R.	27	48	+ 21	50.135	— 2.135
	R.R.	174	438	+264	388.802	+ 49.197
4	V	15	17	+ 2	22.300	— 5.300
	C	12	36	+ 24	31.634	+ 4.365
	T.R.	27	53	+ 26	50.135	+ 2.864
	R.R.	262	599	+337	459.601	+139.398
5	V	14	11	— 3	21.261	— 10.261
	C	14	22	— 8	32.460	— 10.460
	T.R.	28	33	+ 5	50.923	— 17.923
	R.R.	174	299	+125	388.802	— 89.802
6	V	15	27	+ 12	22.300	+ 4.699
	C	20	32	+ 12	34.939	— 2.939
	T.R.	35	59	+ 24	56.458	+ 2.561
	R.R.	207	413	+206	415.352	— 2.352
7	V	18	33	+ 15	25.417	+ 7.582
	C	18	24	+ 6	34.113	— 10.113
	T.R.	36	57	+ 21	57.226	— 2.226
	R.R.	185	379	+194	397.652	— 18.652
8	V	7	33	+ 26	13.987	+ 19.012
	C	30	40	+ 10	39.071	+ 9.28
	T.R.	37	73	+ 36	58.014	+ 14.985
	R.R.	250	425	+175	419.917	— 24.947
9	V	15	26	+ 11	22.300	+ 3.699
	C	22	46	+ 24	35.766	+ 10.233
	T.R.	37	72	+ 35	58.014	+ 13.985
	R.R.	115	425	+310	311.334	+ 83.665
10	V	21	37	+ 16	28.534	+ 8.465
	C	16	38	+ 22	33.287	+ 4.712
	T.R.	37	75	+ 38	58.014	+ 16.985
	R.R.	161	403	+242	378.343	+ 24.656
11	V	22	15	— 7	29.573	— 14.573
	C	16	34	+ 18	33.287	+ 7.712
	T.R.	38	49	+ 11	58.802	— 9.802
	R.R.	150	327	+177	369.493	— 42.493
12	V	18	25	+ 7	25.417	— 4.17
	C	26	38	+ 12	37.418	+ 5.81
	T.R.	44	63	+ 19	63.530	— 5.30
	R.R.	174	279	+105	388.802	—109.802
13	V	19	26	+ 7	26.456	— 4.56
	C	26	42	+ 16	37.418	+ 4.581
	T.R.	45	68	+ 23	64.318	+ 3.681
	R.R.	250	615	+365	419.947	+165.052

TABLE 1: Computation of crude and residual gain of individual student reading improvement

Students	Nelson-Denny sub-tests	Pre-raw scores	Post-raw Scores	Crude Gain	Regression of post-test on pre-test	
					Predicted	Residual gain
14	V	30	35	+ 5	37.886	— 2.886
	C	16	34	+ 18	33.287	+ .712
	T.R.	46	69	+ 23	65.106	+ 3.893
	R.R.	107	438	+ 231	415.352	+ 22.647
15	V	27	31	+ 4	34.769	— 3.769
	C	22	40	+ 18	35.766	+ 4.233
	T.R.	49	71	+ 22	67.470	+ 3.529
	R.R.	262	425	+ 163	459.601	— 34.601
16	V	24	31	+ 7	31.651	— .651
	C	26	42	+ 16	37.418	+ 4.581
	T.R.	50	73	+ 23	68.258	+ 4.741
	R.R.	150	269	+ 119	369.493	— 100.493
17	V	27	34	+ 7	34.769	— .769
	C	24	36	+ 12	36.592	— .592
	T.R.	51	70	+ 19	69.046	+ .953
	R.R.	161	356	+ 195	378.343	— 22.343
18	V	20	34	+ 14	27.495	+ 6.504
	C	32	44	+ 12	39.897	+ 4.102
	T.R.	52	78	+ 26	69.834	+ 8.165
	R.R.	94	319	+ 225	324.439	— 5.439
19	V	22	39	+ 17	29.573	+ 9.426
	C	30	36	+ 6	39.071	— 3.071
	T.R.	52	75	+ 23	69.834	+ 5.165
	R.R.	226	450	+ 224	430.638	+ 19.361
20	V	29	28	— 1	36.847	— 8.847
	C	24	48	+ 24	36.592	+ 11.407
	T.R.	53	76	+ 23	70.622	+ 5.377
	R.R.	250	344	+ 94	449.947	— 105.947
21	V	23	27	+ 4	30.612	— 3.612
	C	30	40	+ 10	39.071	+ .928
	T.R.	53	67	+ 14	70.622	— 3.622
	R.R.	287	403	+ 116	379.715	— 76.715
22	V	31	35	+ 4	38.925	— 3.925
	C	26	32	+ 6	37.418	— 5.418
	T.R.	57	67	+ 10	73.773	— 6.773
	R.R.	384	511	+ 127	557.755	— 46.755
23	V	26	38	+ 12	33.730	+ 4.269
	C	32	34	+ 2	39.897	— 5.897
	T.R.	58	72	+ 14	74.561	— 2.561
	R.R.	468	599	+ 131	625.336	— 26.336
24	V	28	28	± 0	35.808	— 7.808
	C	32	26	— 6	39.897	— 13.897
	T.R.	60	54	— 6	76.137	— 22.137
	R.R.	262	599	+ 337	459.601	+ 139.398
25	V	28	33	+ 5	35.808	— 2.808
	C	34	44	+ 10	40.724	+ 3.275
	T.R.	62	77	+ 15	77.713	— .713
	R.R.	195	226	+ 31	405.697	— 179.697
26	V	31	35	+ 4	38.925	— 3.925
	C	32	30	— 2	39.897	— 9.897
	T.R.	63	65	+ 2	78.501	— 13.501
	R.R.	195	425	+ 230	405.697	+ 19.302



TABLE 1: Computation of crude and residual gain of individual student reading improvement

Students	Nelson-Denny sub-tests	Pre-raw scores	Post-raw Scores	Crude Gain	Regression of post-test on pre-test	
					Predicted	Residual gain
27	V	23	31	+ 8	30.612	+ .387
	C	40	42	+ 2	43.203	— 1.203
	T.R.	63	73	+ 10	78.501	— 5.501
28	R.R.	161	511	+350	378.343	+132.656
	V	33	40	+ 7	41.063	— 1.003
	C	30	40	+ 10	39.071	+ .928
29	T.R.	63	80	+ 17	78.501	+ 1.498
	R.R.	140	538	+398	361.447	+176.552
	V	26	30	+ 4	33.730	— 3.730
30	C	38	38	+ 0	42.376	— 4.376
	T.R.	64	68	+ 4	79.289	— 11.289
	R.R.	174	413	+239	388.802	+ 21.197
31	V	26	30	+ 4	33.730	— 3.730
	C	40	50	+ 10	43.203	+ 6.796
	T.R.	66	80	+ 14	80.865	— .865
32	R.R.	207	438	+231	415.352	+ 22.647
	V	32	40	+ 8	39.964	+ .035
	C	36	40	+ 4	41.550	— 1.550
33	T.R.	68	80	+ 12	82.441	— 2.441
	R.R.	262	615	+353	459.601	+155.398
	V	37	66	+ 29	45.159	+ 20.840
34	C	34	52	+ 18	40.724	+ 11.275
	T.R.	71	118	+ 47	84.805	+ 33.194
	R.R.	161	290	+129	378.343	— 88.343
35	V	29	44	+ 15	36.847	+ 7.152
	C	46	44	— 2	45.682	— 1.682
	T.R.	75	88	+ 13	87.957	+ .042
36	R.R.	174	538	+364	388.802	+149.197
	V	28	33	+ 5	35.808	— 2.808
	C	48	36	— 12	46.508	— 10.508
37	T.R.	76	69	— 7	88.754	— 19.745
	R.R.	359	461	+102	537.642	— 76.642
38	V	36	44	+ 8	44.120	— .120
	C	44	46	+ 2	44.855	+ 1.144
	T.R.	80	90	+ 10	91.896	— 1.896
39	R.R.	226	499	+273	430.638	+ 68.361
	V	40	51	+ 11	48.276	+ 2.723
	C	42	56	+ 14	44.029	+ 11.970
40	T.R.	82	107	+ 25	93.472	+ 13.527
	R.R.	161	356	+195	378.343	— 22.343

score. If the point falls below the regression line, the distance between its position and the regression line indicates that the student's performance was lower than predicted on the basis of his pre-test scores and a minus sign precedes his residual gain score. Thus, a minus sign does not spell failure of improvement, but tells that the student did not yet improve as much as was expected upon prediction.

For instance, student No. 7 in Table 1 received a pre-course vocabulary raw score of 18 and post-course raw score of 33 which denotes a crude gain of +15. When considering the same pre- and post-test

TABLE 2: Graphical presentation of crude gain and residual gain for vocabulary, comprehension, total reading, and reading rate of individual student reading improvement.

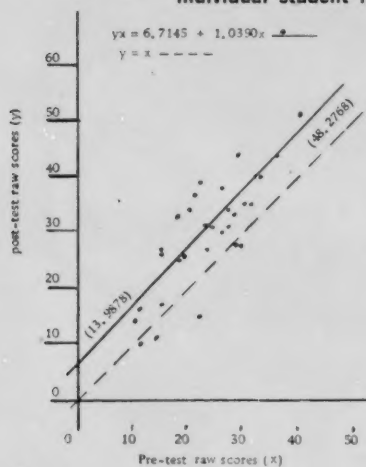


Figure 1. Regression line, vocabulary -

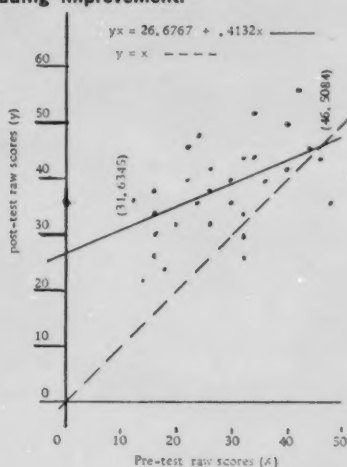


Figure 2. Regression line, comprehension -

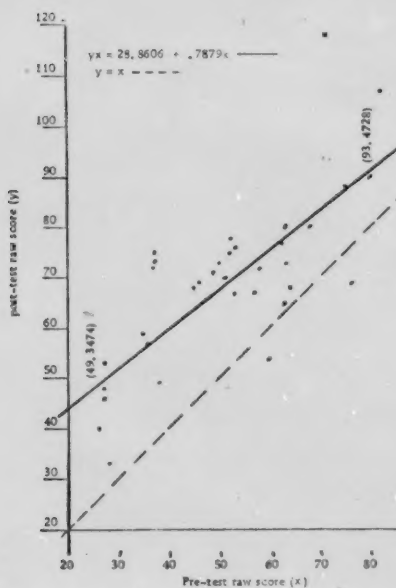


Figure 3. Regression line, total reading -

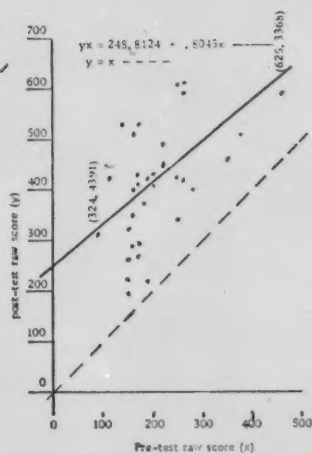


Figure 4. Regression line, reading rate -

raw scores his gain as predicted was +7.582 units above the regression line as shown in Table 2, Fig. 1.

The same student's performance in comprehension showed a crude gain of +6 units but according to prediction fell further behind by -10.113 units (Table 1). In relationship to the regression line he placed below as shown in Table 2, Fig. 2. In total reading his improvement in crude gain was +21 units, but when measured by the residual gain procedure the same total reading performance was by -.226 units (Table 1) lower than it should have been according to prediction and his performance placed therefore below the regression line (Table 2, Fig. 3). The crude gain in his reading rate performance was +194 units, while the residual gain upon prediction indicated -18.652 units (Table 1) below the regression line (Table 2, Fig. 4). In conclusion, the student's No. 7 performances in comprehension, total reading, and reading rate have not improved to the degree as they were predicted on the basis of final on initial scores.

Contrasting the student's residual gains with the crude gains (Table 1, No. 7), it appears that his crude gain assessment denotes substantial but erroneous overestimation of his reading advancement.

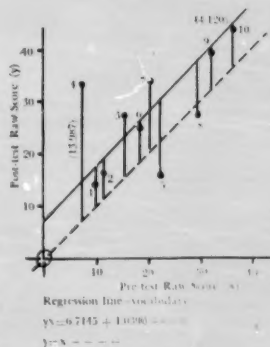
CRUDE GAIN VERSUS RESIDUAL GAIN

To analyze the effects of crude gain and residual gain on differences in individual proficiency, the reading performances in vocabulary of ten college freshmen were selected from Table 1. These results are listed in the following table (Table 3) and are plotted on the accompanying graph.

At inspection of Table 3 the numerical units of crude gain with those of residual gain are compared. The graph shows the crude gain units in relationship to the zero line as well as the residual gain units in relationship to the regression line. To assess crude gain or residual gain units on the graph, it is necessary to count either upward or downward from the zero line or the regression line.

Table 3

No. on Graph	No. in Table 1	Crude gain	Residual gain
1	1	+ 4	- 3.105
2	2	+ 5	- 2.144
3	6	+12	+ 4.699
4	8	+26	+19.012
5	11	- 7	-14.573
6	12	+ 7	- .417
7	18	+14	+ 6.504
8	20	- 1	- 8.847
9	31	+ 8	+ .035
10	35	+ 8	- .120



What message do the results of crude gain compared with the results of residual gain convey to the reading instructor in regard to the student's individual reading improvement? In eight cases out of ten crude gain tended to overestimate individual reading proficiency and in two cases tended to underestimate individual reading proficiency. In the eight cases with the exception of but two—No. 5 and 8—crude gains indicated that each student has advanced further in his reading proficiency than he actually did, while in the remaining two cases crude gains indicated that each student has fallen less behind in his reading proficiency than he actually did on prediction of residual gains.

Further investigation of the effects of crude gain and residual gain, shows a comparison of four comprehension scores in Table 4.

Table 4		
No. in Table 1	Crude Gain	Residual Gain
1	+10	-7.287
8	+10	+ .928
25	+10	+3.275
30	+10	+6.796

Relying on crude gain results each student appears to have made the same amount of progress expressed in units and therefore may receive the same grade designation of, for instance, B. Examining the residual gains upon prediction of the same four comprehension scores, however, the individual gain units appear to be different from the apparent uniform crude gain units. Applying grade designations in accordance with the residual gains student No. 1 may receive a D, student No. 2 a C, while students No. 3 and 4 may receive a B and an A respectively.

Comparing student performances of crude gain with residual gain in total reading, six comparisons are demonstrated in Table 5.

Table 5		
No. in Table 1	Crude Gain	Residual Gain
3	+21	-2.135
7	+21	- .226
13	+23	+3.681
16	+23	+4.741
19	+23	+5.165
20	+23	+5.377

Crude gain of +21 units for students No. 3 and 7 seems to overestimate again individual proficiency in total reading by +18.865 units and by +20.774 units respectively. Residual gain procedure instead seems to warn the reading instructor that the reading performances of students No. 3 and 7 have apparently fallen further behind by -2.135

units and by $-.226$ units in each case and that the two students have not achieved as predicted.

The following four scores in Table 5 show a crude gain of $+23$ units. While each student's performance in total reading appears to be equal to the other when measured by the crude gain method, no such equal appearance of gain can be claimed when the individual total reading improvement is evaluated in the light of the residual gain procedure. According to crude gain measurement, students who started out with lower pre-test scores tended to improve as much as or more than those students with higher initial scores. Measuring, however, total reading improvement by the residual gain procedure a more realistic and reliable advancement is the answer. Students who started with a higher initial status tended to improve in accordance with their own individual proficiency, because residual gain is the deviation of final scores from the regression line of final on initial scores.

SUMMARY

The comparison of the effects of crude gain with those of residual gain in individual reading improvement as measured on the Nelson-Denny Reading Test, Revised, Form A and B, in vocabulary, comprehension, total reading, and reading rate may permit the following conclusions to be drawn. Crude gain tends to

1. overestimate or underestimate individual reading improvement,
2. ignore individual differences in the initial status,
3. give cause to faulty application of grades attached to individual reading performances, and
4. introduce erroneous or fallacious impressions of individual advancement in reading proficiency.

In contrast to the crude gain method of measuring individual gain, residual gain procedure tends

1. to be a more reliable measurement of individual gain in most reading situations,
2. not to affect the measure of gain in spite of initial differences on the pre-test scores,
3. to provide a more realistic basis for attaching grades to individual reading improvement, and
4. to estimate the inferior and the superior improvers in accordance with their own proficiency and progress in the improvement of reading.

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Changing Patterns of Eye Movement Among Students in Reading Classes and Composition-Literature Classes

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Many studies have been made in the measurement of eye movements during the reading process. Taylor, et al (1) have found averages for all grades, 1-12, for span, regression, rate, fixations, and duration of fixation. These data agree, in a loose fashion, with much of the data found by other researchers, although the tolerance in measurable factors is quite wide. For example, the duration of fixation has been found to vary (in college populations) from .12 seconds to .55 seconds; the span (in college populations) from 1.11 to 2.26 words before training.

So far as this writer knows, only two researchers have measured these factors before and after a random sampling of students have taken a reading course. Both of these indicated that significant changes occur in all four factors. It could be argued, however, that these changes would have occurred without the course in reading, since it is established that eye movement patterns change as students progress from grade to grade (2) (3).

The present research was set up to clarify this point. In the fall semester of 1966-67, random samples of 175 students were selected from (1) 1100 freshmen about to embark on a 40-session course in developmental reading, (English 185); (2) 1200 freshmen about to take a 45-session course in composition-literature, (English 101). These students (none of whom were taking both courses) were asked to have their eye-movement patterns recorded by an electro-oculograph, a machine designed and built by the Department of Electrical Engineering at Purdue University. This machine translates amplified electrical current generated by eye-muscle movements onto an ink-writing oscillograph. The test materials consisted of 1200 word-long expository material, grade level 13 (modified Flesch formula). Ten questions, designed to measure whether the subject was "reading" rather than merely looking, were given at the end of the reading. Although the scores of both groups were nearly identical, they are not involved in these data, since the tests do not pretend to measure comprehension in the broad sense. The average score of all subjects was 61%. (When given to random sampling of freshmen, without the apparatus of oculographing, score average was 69%).

At the end of the semester the subjects in both groups were again oculographed, and an equivalent test was given. Attrition due to class changes, drop-outs, and the like reduced the number of the reading course group to 153 and the composition course group to 140—both sufficiently large for random sampling operations. All the eye-movement tapes were read by two trained persons. All tapes were coded, and so the readers did not know whether they were control group tapes or experimental group tapes, or whether these tapes were from the beginning or the end of the semester.

The results indicate that the group taking the reading course altered their eye-movement patterns quite differently from those taking the composition-literature course. These differences are beyond chance. (See tables.) All measurable factors—rate, span, and regressions, were changed significantly as between groups. The data suggest that a course in developmental reading which has as one of its objectives the discipline of eye movement patterns either (a) increases speed, reduces fixations, and reduces regressions more than does a course in composition-literature; or (b) increases reading efficiency and performance, such as clarity of perception and rapidity of assimilation, in such a way that speed is increased and fixations and regressions are reduced.

The question then, of whether eye-movement changes are a cause of or a result of efficient reading, does not hold much relevance to this study; somehow the course in developmental reading, (a course, incidentally, which emphasizes comprehension, flexibility, and critical, responsive reading) does result in eye-movement changes different from the changes in a composition-literature course.

NOTES

1. Differences between conditions (between groups)

All differences are significant; the lowest value of t (2.26) falls between 1 and 5% levels. English 101 teaches people to read faster and with fewer fixations, but with more regressions. English 185 increases speed and decreases both of the other measures. The extreme values of t in the experimental group are impressively large.

The fact that correlations are high between the two conditions makes small differences assume greater importance than they would if different persons were

DIFFERENCES BETWEEN CONDITIONS

		English 185 (N = 153)				English 101 (N = 140)			
	CONDITION	MEAN	S.D.	r	t	MEAN	S.D.	r	t
SPEED	PRE	273.74	80.54	.57	21.09	267.85	85.37	.75	4.32
W.P.M.	POST	461.80	136.20			289.26	86.71		
FIXATION	PRE	4.65	1.60	.60	17.05	4.37	1.86	.77	4.86
(per 10 words)	POST	2.86	1.14			3.84	1.58		
REGRESSION	PRE	1.37	1.57	.53	5.51	1.81	1.87	.48	2.26
(per 10 words)	POST	.77	1.00			2.18	1.88		

DIFFERENCES BETWEEN GROUPS							
	GROUP	PRE-TRAINING			POST-TRAINING		
		MEAN	S.D.	t	MEAN	S.D.	t
SPEED	185	273.74	80.54	.60	464.80	136.20	13.24
W.P.M.	101	267.85	85.37		289.26	86.71	
FIXATION	185	4.65	1.60	1.37	2.86	1.14	6.12
(per 10 words)	101	4.37	1.86		3.84	1.58	
REGRESSION	185	1.37	1.57	2.18	0.77	1.00	7.86
(per 10 words)	101	1.81	1.87		2.18	1.89	

tested after training. The standard errors (of differences) become small when correlations are taken into account.

2. Differences between groups (between conditions)

The standard errors in this case are not made smaller by the existence of correlations and the *t* ratios are correspondingly smaller.

Speed:

In the pre-training group, $t = .60$ indicates that the two groups can be regarded as having been selected from a single population. The extreme value of t (13.24) after training makes it clear that the groups did not come from the same population after training.

Fixation:

In the pre-training group, $t = 1.37$ falls short of conventional significance level; this corresponds roughly to a 20% significance level. The 185 group has moved from almost significantly more fixations to very significantly fewer.

Regression:

The 185 group has fewer regressions (5% level) pre-training and (.1% level) post-training.

3. Differences between correlations:

If the individuals in either group held their rank (position with respect to the rest of the group), the before-after correlations would be large even though the mean had changed. With respect to speed and fixations, this condition comes nearer to being achieved in the 101 than in the 185 group. The inference is that in the 101 group, the best readers in the beginning were still the best readers at the end, even though all had improved. This is supported by the fact that the standard deviation remains about the same in these cases, suggesting that most of the people changed to about the same extent and the within-group relationships changed little.

The lower correlations in the 185 group indicate that some (by no means all, because the correlation is still high) of the slow readers improved markedly so that within-group standings are not as stable. The very large increase in standard deviation of speed in this group points to a similar circumstance; there are a number of large deviations from the mean, ergo either some have achieved a very high speed, or some have failed to improve, or both.

4. Ratios of variances:

These are comparisons between the variances in the pre and post training measures within each group. They provide a rough measure of the comparability of the dispersions of the data in much the same way that t is a measure of comparability of the means.

DIFFERENCES BETWEEN CORRELATION					RATIOS OF VARIANCES					
MEASURE	ENG	105	ENG	101	t	MEASURE	185	$\propto$	101	$\propto$
SPEED	$r = .57$		$r = .75$		2.76	SPEED	2.86	<02	1.63	
FIXATION	.60		.77		2.67	FIXATION	2.00	<02	1.33	.10
REGRESSION	.53		.48		.60	REGRESSION	2.46	<02	1.02	

Averages at Beginning and End of Semester				
	Experimental		Control	
	English 185		English 101	
	Before	After	Before	After
Fixations (per 100 words)	46.5	28.6	43.7	38.7
Regressions (per 10 words)	1.37	.77	1.81	2.18
Span (in words)	2.15	3.49	2.26	2.58
Rate W.P.M.	273.74	464.80	267.85	289.26
Duration of Fixation (in seconds)	.47	.45	.50	.54

The only big shift in variances in the control group is in Fixation score where variability is decreased (about 10% significance level). In the experimental, all of the differences have less than a 2% likelihood of chance occurrence. Variance increases in speed and decreases in the other measures.

The implications of these differences are not apparent without examining the data in more detail. Unfortunately, they cast some doubt on the *t* ratios associated with the corresponding differences.

5. One of the inferences that might be drawn from this research concerns "speed" in reading. Although the expository material read in the experiment was relatively easy—13th grade level, the all-subject average at the beginning was approximately 270 W.P.M.

The question arises—could these students learn to "read" this material at 1000 or 2000 W.P.M.? If they averaged 60% simple recall at 270 W.P.M., what would have been the simple recall if they had skimmed at 2000 W.P.M.? And what would have been their "comprehension" in the large sense of seeing relationships and making judgments at such higher "speeds"?

The answer, probably, is very little. Eye movement studies suggest that 800-900 W.P.M. is the upper limit of the capacity of the eye to stop on its maximum span and then move to the next stop, and so on. And this study, like many others, suggests that eye-movement is but a single aspect of reading efficiency. So-called speed, to which eye-movement is so often closely associated, is almost meaningless when separated from comprehension in the larger sense. Most teachers would lift eyebrows if a student said he could "read" the U.S. Constitution at 2000 W.P.M. And with the limitations apparently set by nature on human eye-movement, what can be "comprehended" of *Moby Dick* by the average college student if he attempts to "read" it at 1000 W.P.M.?

Perhaps he could "comprehend" that Ahab has but one leg, but what would he be able to comprehend of Ahab's concept of God, and more importantly, of his *own* concept of Ahab's concept!

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The Status of School Vision Screening: A Review of Research and Consideration Of Some Selected Problems

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INTRODUCTION

Interest in vision as it relates to reading is longstanding. The early period was marked by a strong tendency to overemphasize the importance of specific factors and oversimplify causes for reading disability. Single factor explanations such as the influence of visual disabilities as major causes for reading failure predominated. Research has been voluminous in this area. Several discussions and reviews (4, 8, 16, 17, 21) of these studies place the role of vision in a somewhat clearer perspective. The serious student would be well advised to read reports such as these carefully, for today the multi-dimensional nature of learning difficulties is well understood by the educator, and the sophisticated vision specialist is more aware than ever that he and his discipline have an important and specific contribution to make in learning to read, but not a total one (3, 20).

If the educator and vision specialist are in agreement in any area, both are aware of the high incidence of visual problems in the general school population (1, 5). Visual screening procedures have been designed for the purpose of identifying individuals in large populations requiring referral for professional eye care. These instruments have been studied, compared, and debated for several decades, and a vast and somewhat confusing body of literature is available consisting of a few well-designed studies of visual screening procedures, many reports, surveys, and essays representing various points of view.

The educator charged with the selection of visual screening instruments becomes bewildered by the complex issues involved in such decision-making. Choices seem almost impossible between expensive or inexpensive, long or short, familiar or unfamiliar tests, as well as easily administered or complicated tests, etc. Under these conditions, the best intentioned of school workers frequently have resorted to the old and familiar Snellen Test (American Optical Company, Southbridge, Mass.), the earliest available, the least expensive, the simplest to administer, and the least complex test to interpret. Rosen (19) presents evidence in a study of vision problems in a first grade population of the occurrence of visual defects that are not measured by the Snellen Test. Many other writers decry the use of this procedure

as the sole screening device (2, 7, 24, 25, 26). The Snellen Test, in spite of the problems associated with its exclusive use, is probably still the most commonly utilized visual screening instrument in our nation's schools.

Other visual screening devices and batteries are available for school screening purposes. Bond and Tinker (4) and Robinson (15) present a description of several of the more commonly used instruments. Among these are the Keystone Visual Survey (Keystone View Company, Meadville, Pa.), the Ortho-Rater Tests of Visual Efficiency (Bausch and Lomb, Rochester, N.Y.), the Massachusetts Vision Test (Welch-AlLEN Company, Auburn, N.Y.), the Eames Eye Test (World Book Company, Yonkers-On-Hudson, N.Y.), the American Medical Association Rating Card (American Medical Association, Chicago, Ill.), and the Sight-Screener (American Optical Company, Southbridge, Mass.). The A.M.A. Rating Card is similar to a Snellen Chart; however, it has been designed for near-point testing (14 inches) of visual acuity. The Keystone, Massachusetts, Eames, Sight-Screener and Ortho-Rater Tests are batteries of visual screening measures—each battery, when compared to others, measures some overlapping and similar, as well as several dissimilar, visual characteristics. Wide variations can be noted in targets, testing, and other conditions in comparisons made between these batteries. The reader is referred to the manuals of these devices for detailed descriptions of subtests.

ACCURACY OF REFERRAL

Since the major purpose of the standard types of visual screening batteries is to provide non-specialists with a means for the identification of individuals requiring referral for professional eye care, one approach for studying the validity of these batteries has been to compare referral results obtained from these instruments to the findings of trained visual examiners. Numerous studies in this area have been reported over the last two decades (6, 9, 10, 11, 12, 14, 22, 23, 27). Some of the findings are summarized below:

A. Accuracy of Referral of Some of the Standard Screening Procedures:

(1) Various vision screening procedures, when matched against trained professional examiners' findings, appear to provide rough approximations of the pupils requiring referral for eye care. (2) The stereoscopic visual screening devices appear to have relatively high correct referral rates, but accompanying over-referral rates tend to be as high or higher. (3) The Snellen Test is considered a "safe" screening device since it has low "over-referral" rates; however, its high "under-referral" rate would appear to mitigate against its exclusive use. (4) The Massachusetts Vision Test tends to have low over-referral rates, particularly when retests of failure cases are made; like the

Snellen Test, however, it has significant under-referral rates. (5) In general, the higher the rate of correct referrals, the higher also is a battery's tendency to overrefer pupils. The lower the number of correct referrals, the higher the tendency for under-referrals. (6) A Modified Clinic Technique, utilizing some procedures found in professional examinations, has been identified as the most effective method in screening pupils for referral. This approach requires trained examiners and some technical equipment.

B. Some Factors Influencing Accuracy of Referral:

Many discussions of factors pertaining to problems of visual screening batteries can be located in the literature. A few major points follow: (1) Seldom are all characteristics measured in screening batteries included in a vision specialist's testing routines. Screening and clinical findings are rarely obtained under the same conditions and infrequently are clinical judgments of the significance of various visual findings equivalent to the cut-off scores of visual screening instruments. Since vast differences exist between screening and clinical procedures, it can be expected that findings will differ between the procedures. The Modified Clinic Technique is one way of bringing visual screening into harmony with clinical procedures. (2) Involving visual specialists as consultants in all phases of planning of the screening program (selection of instruments, training testers, establishment of cut-off points for referral, synthesizing findings from several subtests in a battery for final interpretations, etc.) can also be reasoned to provide for greater accuracy in school screening procedures. (3) Retesting of pupils failing specific subtests prior to referral can be a useful check on the reliability of measures. (4) Supplemental screening routines, using additional tests, checklists, and observational techniques, might tend also to add to the accuracy of referrals. (5) School-community relations activities should be included in visual screening programs. Parents and vision specialists must jointly accept the concept that over-referrals need not be considered as harmful as under-referrals. The former factor has too long been emphasized as the major defect of screening devices. While writers acknowledge that the incidence of this factor should be reduced, it also must be accepted that "missing" children who require vision care should be considered a far more serious defect of screening programs. (6) The manner in which screening batteries are administered can also have an effect on the accuracy of results: one study (13) has demonstrated that amending instructions for test administration can influence the reliability of test results. Instructions for test administration in visual screening manuals frequently require adjustments for various populations. Conditions for testing, including facilities, must also be carefully considered. (7) Certain subtests in various batteries tend to account for disproportionately high percents of failures. These sub-

tests might be considered as factors influencing over-referral rates in particular screening batteries. Both the cut-off scores and the structure of these subtests require careful scrutiny. To use any battery of measures with confidence, test consumers should have some assurance that the various subtests in a screening battery are the best measures of the abilities they purport to measure. When data obtained from any subtest are continuous, intercorrelations among tests can be calculated and factor analysis can be utilized to study the factors involved in a given battery and the loadings of subtests on these factors. Robinson and Huelsman (18) have studied several visual screening batteries in this way. Working with a highly select sample of fourth and seventh grade pupils from a laboratory school, the writers included two screening batteries in their analysis and several other visual measures infrequently used in typical school screening situations. Due to the unrepresentative nature of the sample, the writers recommended the need for further study.

CONCLUSIONS

Comfortable, efficient visual functioning is one set of abilities among many other interacting characteristics that are important in school learning. School vision screening for the identification of pupils requiring referral is a necessity, yet most commentaries on the general status of such programs are negative. Too often such programs are characterized by outmoded procedures, infrequently administered, by inadequately trained personnel under poor conditions. The assumption that the Snellen Test, or any maladroitly handled screening procedure, used alone will provide adequate visual screening information has been shown to be fallacious. For some reason, educators tend to expect more from visual screening devices than they do from their own educational tests and measurements. Lack of knowledge regarding the nature of vision and visual screening instruments, coupled with vague confidence in the "instruments' abilities" to make decisions for the tester can result in many difficulties.

Problems do exist with the use of various visual screening batteries. Assumptions that these procedures, as they are commonly used, provide reliable and valid information for decision-making have been questioned. Under question, also, are the adequacy of cut-off scores, directions for administering the tests, and the accuracy of measurement of some subtests in various batteries. Indeed, the very definition of "seeing" underlying these instruments has been questioned. However, clinicians in the eye care fields, studying available screening instruments, often make superficial criticisms and condemnations of these devices. Many continue to study screening instruments as if they were considering them for use in clinical diagnosis. Yet the eye professions are neither in agreement within nor between groups as to

various theoretical and practical aspects concerning vision and its measurement. Vision is far from being a simple process and constructs generating hypotheses amenable to empirical study have yet to be presented. It would seem that to realize major advances in measuring visual abilities, the professions must eventually develop constructs in which variously defined visual processes are organized hierarchically in such a way that visual factors are hypothesized and individual subtests, representing relatively pure measures of these abilities, are developed. Explorations of the factor meanings of these test items in developmental studies could provide the kind of data that would contribute towards the more scientific development of improved vision screening procedures. Such studies would be most useful.

Frequently much is expected of visual screening instruments. While these devices for better or worse are the best we have on hand today, far too little is expected of those who select, administer, interpret, and follow-up their use. Since the purpose of these screening devices is to obtain information necessary for identifying pupils requiring referral for professional attention, one major improvement could be realized in the involvement of the professionals themselves in these programs. With their specialized help, the reliability of the information obtained from more carefully designed screening programs can be looked upon with more confidence than the findings obtained under the usual haphazard methods of visual screening. Many useful ideas could be included that might contribute to the overcoming of some defects in the usual procedures. These specialists can aid in the development of screening procedures differentiated for age, type, and number of pupils involved. The crucial aspect of follow-up of vision screening programs with referral, therapy, and communications between the doctor and the school might also be better realized under these conditions. Training testers and improving systems for interpreting test results might also be more successfully handled when the specialists themselves are in the program. School vision screening must not be an "either/or" proposition. School workers and specialists must flexibly and harmoniously design and operate these procedures.

With the exception of a few studies and several important local endeavors in different sections of the United States, it seems that the various professions involved have never persistently committed their resources to a solution of this problem. Lack of communications, sometimes compounded by absurd misunderstandings within various professional groups as to just what kind of contribution they can make to school learning, adds to the lack of interprofessional trust that perhaps underlies the problem of inadequate school vision screening. The resultant effects are reflected in the recurring dismal reports concerning the status of school vision screening. Pupils at all

levels continue to be penalized by having to work under conditions of visual functioning that are less than optimal, while changes in the status of school vision screening remain elusive in spite of decades of discussion.

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Junior and Senior High School Teachers' Attitudes Toward Teaching Reading in the Content Areas

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Reading must be taught at the secondary school level. Students who have not, for any of a multitude of reasons, mastered the elementary level skills need special help; but, equally important, all students need to refine their reading skills to cope with increasingly complex reading tasks in the content areas.

Most secondary teachers would applaud and endorse the preceding statements. Better reading skills are as difficult to fault as better apple pie or better five-cent cigars. The problem is that although the desirability of the end is clear, the means are not. To say that every teacher is a teacher of reading is no solution, for the fact is that every secondary teacher is not a teacher of reading. The slogan does not alter the fact.

Yet if the need to teach reading in the content areas is generally recognized, then why is reading not being taught by all content area teachers? Is it because they feel no personal responsibility? Is it that they are resentful because they feel that elementary teachers have not done their job? These appear to be the assumptions underlying many in-service programs: Much time is spent in selling the idea of teaching reading at the secondary level. Or is it essentially because they feel inadequately prepared to do the job? Do they expect a reading specialist to teach reading just as they teach the content in their special areas? Answers to questions like these could be useful as in-service programs are planned and as total reading programs are designed.

In the present paper an inventory designed to determine the attitudes of secondary teachers toward the teaching of reading is presented, preliminary results obtained with the inventory are examined, and tentative answers to some of the questions about teachers' attitudes are suggested.

CONSTRUCTION OF THE ATTITUDE INVENTORY

An instrument to measure the direction and intensity of teachers' attitudes toward the teaching of reading in the content areas of the secondary school was constructed. Fourteen items, seven positive and seven negative, were written and arranged in a Likert-type format as described by Edwards (2, p. 151). In the Likert model, respondents are asked to choose one of the following as a response to an item-statement: Strongly Agree, Agree, Undecided, Disagree, Strongly Dis-

agree. A-priori weights of one integer difference are assigned in descending order to the responses for positive items and in ascending order to the same responses for negative items. Thus, a total score can be obtained for the entire inventory, with a high score reflecting a more positive attitude than a low score.

The fourteen item inventory is given in the schema that follows. The intent was to include items that would get at teachers' perceptions of (a) their personal role in teaching reading in the content areas, (b) the role of the reading specialist at the secondary level, (c) their personal preparation and ability to teach reading, and (d) the actual task of teaching reading skills (e.g., that it is an enjoyable or distasteful task). Weights of 5, 4, 3, 2, 1 were assigned a-priori to the response choices for the positive items (Items 2, 3, 4, 9, 11, 13 and 14) and weights of 1, 2, 3, 4, 5 were assigned a-priori to the same choices for the negative items (Items 1, 5, 6, 7, 8, 10 and 12).

ATTITUDE INVENTORY

1. In the secondary school the teaching of reading should be the responsibility of reading teachers only.
2. Secondary school teachers can teach reading effectively without special university courses in methods of teaching reading.
3. The teaching of reading skills can be incorporated into content area courses without interfering with the major objectives of those courses.
4. Any secondary school teacher who assigns reading should teach his or her students how to read what is assigned.
5. With rare exceptions, students should know what there is to know about reading before they are permitted to leave the elementary school.
6. Only remedial reading should be necessary in the secondary school and that should be done by remedial reading teachers in special classes.
7. Teaching reading is a technical process that secondary school teachers generally know nothing about.
8. Secondary school teachers cannot teach reading without special material designed for that purpose.
9. Teaching reading is a necessary and legitimate part of teaching any content course in the secondary school.
10. Teaching reading takes all the fun out of teaching at the secondary school level.
11. Every secondary school teacher should be a teacher of reading.
12. At the secondary school level students want to learn content, not how to read.
13. Integrating the teaching of reading with the teaching of specific content can be as exciting for the content area teacher as teaching content only.

14. Content area teachers in the secondary school are probably more competent to teach the reading skills needed for their subjects than special reading teachers.

The Reciprocal Averages Computer Program (RAVE) developed by Baker (1) was used to obtain a reliability estimate for the inventory. RAVE yields, among other things, an initial Hoyt reliability estimate based upon the a-priori response weights assigned by the investigator and subsequent reliability estimates derived by a reiterative process whereby responses are re-weighted to maximize the internal consistency of the instrument. The new weights are assigned on the basis of analyses of each person's responses to all of the items. With 87 junior and senior high school teachers responding, the Hoyt reliability coefficient was .848 with the initial weights and .857 with optimal weights.

ATTITUDES OF JUNIOR AND SENIOR HIGH SCHOOL TEACHERS

The inventory was administered to 87 teachers, 38 at the junior high school level and 49 at the senior high school level. The data from the entire sample were examined to obtain reliability estimates for the inventory, as already reported. In addition, the data from each subgroup were examined separately to provide a basis for comparing junior and senior high school teachers' reading attitudes as well as a general survey of attitudes as measured by the inventory.

The respondents were members of the faculties of junior and senior high schools in a Wisconsin city of about 45,000 population. Neither group was engaged in any special in-service or experimental activities connected with reading at the time the inventory was administered. The teachers responded anonymously and were encouraged to avoid the "undecided" response category whenever possible.

Reliability coefficients were high for each subgroup: .802 with a-priori weights and .836 with optimum weights for the junior high group and .887 and .915 for the senior high group. With a possible total score range of 14 to 70, the total score range was 22 to 65 ($\bar{X}$ = 41.9, SD = 9.39) for the junior high group and 19 to 54 ($\bar{X}$ = 45.3, SD = 10.5) for the senior high group. Two conclusions appear to be justified: (1) in view of the high initial reliability and the small change with optimum weights, direct examination of actual responses to individual items is defensible and likely to yield meaningful information; and (2) while the mean total scores of the two subgroups did not differ greatly, the range was more restricted—due mainly to the lower ceiling—for the senior high group. Inspection of the two groups' means and ranges also shows that there was no general tendency for responses to pile up at either end of the scale.

The percent of junior (N = 38) and senior (N = 49) high school teachers who chose each of the five responses—Strongly Agree, Agree,

Undecided, Disagree, Strongly Disagree—to each of the inventory is given in Table 1.

TABLE 1: Percent of Junior and Senior (in Parentheses) High School Teachers' Responses in Each Category by Item

Item	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1	4.1 (7.9)	20.4 (23.7)	... (2.6)	42.8 (52.6)	32.6 (13.2)
2	6.1 (2.6)	28.6 (31.6)	4.1 (2.6)	42.8 (40.3)	18.4 (21.1)
3	16.3 (5.3)	51.0 (73.6)	2.0 (...)	22.4 (13.2)	8.2 (7.9)
4	12.2 (10.5)	55.1 (65.8)	6.1 (...)	20.4 (15.8)	6.1 (7.9)
5	12.2 (15.8)	26.5 (50.0)	4.1 (...)	44.9 (31.6)	12.2 (2.6)
6	4.1 (10.5)	22.4 (15.8)	2.1 (2.6)	53.0 (63.1)	18.4 (7.9)
7	6.1 (10.5)	30.6 (34.2)	8.2 (...)	49.0 (52.6)	6.1 (2.6)
8	4.1 (7.9)	30.6 (34.2)	2.0 (...)	59.2 (55.2)	4.1 (2.6)
9	28.6 (7.9)	53.0 (65.8)	... (2.6)	18.4 (21.0)	(2.6)
10	(2.6)	8.2 (10.5)	12.2 (10.5)	57.1 (65.8)	22.4 (10.5)
11	18.4 (7.9)	53.0 (40.3)	... (10.5)	22.4 (34.2)	6.1 (10.5)
12	4.1 (10.5)	42.8 (36.8)	2.0 (...)	40.8 (44.7)	10.2 (7.9)
13	12.0 (5.3)	46.9 (55.2)	6.1 (5.3)	30.6 (23.7)	4.1 (10.5)
14	8.2 (2.6)	24.5 (28.9)	2.0 (10.5)	49.0 (44.7)	16.3 (13.2)

In general, the junior and senior high school teachers responded similarly to the individual items, with the exception of Item 5 and Item 11. Sixty-six percent of the senior high teachers agreed with Item 5 that "... students should know what there is to know about reading before they are permitted to leave the elementary school," whereas only 39 percent of the junior high teachers agreed and 57 percent disagreed. Only 48 percent of the senior high teachers agreed with Item 11 that "Every high school teacher should be a teacher of reading"; whereas 71 percent of the junior high teachers agreed. The implication appears to be that, in their transitional position, the junior high teachers as a group are more tolerant of elementary pupils' limitations in reading ability and they are more likely to accept the teaching of reading as a personal responsibility.

CONCLUSIONS AND IMPLICATIONS

Several conclusions and implications regarding both junior and senior high school teachers' attitudes toward the teaching of reading can be drawn from the data reported in Table 1. Strongly Agree-Agree and Disagree-Strongly Disagree responses are collapsed for discussion purposes.

The response trends for two items, Item 2 and Item 4, were the opposite from what was expected as an indication of a generally positive attitude. Over 60 percent of the teachers disagreed with Item 2: "Secondary school teachers can teach reading effectively without special university courses in methods of teaching reading." About 60 percent of each group disagreed with Item 14: "Content area teachers in the secondary school are probably more competent to teach the

reading skills needed for their subjects than special reading teachers." The two items seem to reflect a general feeling that secondary teachers are not competent to teach the reading skills without some special training. The unanswered question here is: How much special training would be enough? Is a credit course from a college or university needed, or would a series of in-service sessions be adequate?

There was no clearly established trend in the responses to Items 7 and 12. Item 7—"Teaching reading is a technical process that secondary teachers generally know nothing about"—may have evoked a mixed response at least partly because of a feeling that some secondary teachers do know about teaching reading (e.g., language arts and English teachers). Analysis of the RAVE re-weighting of the responses showed that the item did not evoke responses that were internally consistent with responses to the other items. Responses to Item 12—"At the secondary level students want to learn content, not how to read"—were evenly divided between Agree and Disagree. No explanation is apparent to the writers.

There were modest tendencies to disagree with Item 8—"Secondary school teachers cannot teach reading without special materials designed for that purpose"—and to agree with Item 13—"Integrating the teaching of reading with the teaching of specific content can be as exciting for the content area teacher as teaching content only."

Stronger trends, all in a positive direction, are apparent in the responses to the following items:

1. In the secondary school the teaching of reading should be the responsibility of reading teachers only. **DISAGREE.**
3. The teaching of reading skills can be incorporated into content area courses without interfering with the major objectives of those courses. **AGREE.**
4. Any secondary school teacher who assigns reading should teach his or her students how to read what is assigned. **AGREE.**
6. Only remedial reading should be necessary in the secondary school and that should be done by remedial reading teachers. **DISAGREE.**
9. Teaching reading is a necessary and legitimate part of teaching any content course in the secondary school. **AGREE.**
10. Teaching reading takes all the fun out of teaching at the secondary school level. **DISAGREE.**

Taken together, the attitudes reflected by the six items seem to bespeak not only a willingness to accept responsibility for teaching the special reading skills required in the content areas but also some enthusiasm for the task.

To sum up, it appears that in general the teachers recognize the need for a continuation of reading instruction at the secondary level;

they are willing to accept the responsibility for teaching the special skills required in their content areas; but they feel that they need more training if they are to do the job. These observations are, of course, based upon the responses of a small sample of teachers from a single school system. They need to be replicated in other locations with many more secondary teachers if they are to stand. If they do, we can begin to worry less about selling secondary teachers on recognizing and accepting the responsibility for teaching reading and get on with the task of helping them to develop the requisite skills. Meanwhile, the attitude inventory described here promises to be a useful tool for gathering more descriptive information and for studying changes in attitude that might be attributed to participation in credit courses, in-service programs, and other professional and advancement activities.

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A Comparison Between the Leisure Reading Habits of Female Teachers and Other Women of the Same Social Status

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IMAGE OF THE AMERICAN PUBLIC SCHOOL TEACHER AS A READER

It is often assumed that the leisure reading habits of public school teachers have been thoroughly investigated. This is an erroneous assumption. An exhaustive examination of the literature reveals that the number of studies which have investigated the leisure reading habits of teachers is noticeably limited (4, 15). However, this absence of validating research has not inhibited the critics of public education. In fact, disparaging remarks appear with such frequency and verisimilitude that one is led to believe that they are documented by research. A charge which has been frequently leveled against the profession is that school teachers, both elementary and secondary, do not demonstrate a sincere interest in leisure reading. Succinctly stated, the indictment is that teachers regard reading as a worthwhile activity—for their students. However, their own reading is disappointingly limited qualitatively and quantitatively. It appears that because existing research (14, 16, 18) documents the allegation that teachers pursue only a limited amount of professional reading, critics without the corroboration of additional research have automatically assumed that teachers pursue only a limited amount of leisure reading.

As the result of this absence of validating research, at present, educators can neither accept nor refute the disparaging remarks made by the Rickovers, Raffertys, Smiths, or the John Does that public school teachers pursue little, if any, leisure reading. Therefore, in an effort to aid in resolving this controversy, this investigation was undertaken.

THE PROBLEM

This study is best described as a comparative investigation of the quantitative leisure reading habits of two groups of women—a group of kindergarten through twelfth grade public school teachers and a group of women who were similar to public school teachers in several demographic and sociological respects, namely, social status, city of residence, minimum age, minimum family income, and access to a residential telephone.

SIGNIFICANCE OF THE STUDY

Creating a lasting interest in voluntary, leisure reading which will transfer from the student's school years to his adult life has long been

a major objective of modern reading programs (5, 8, 17). Although a variety of factors are involved in this complex process, recent research findings (4, 8, 10) indicate that the reading habits of both teachers and parents are instrumental in shaping the lifelong reading habits of our present school population. Therefore, descriptive data on the reading activities of the individuals who are presently influencing the next generation of adult readers appears to be of relevance to educators.

DESIGN

Sample. The teacher population selected for this investigation was comprised of 200 full-time classroom or special area female teachers in the Canal City, New York, Public School System. Administrators were not included in this investigation. The non-teacher sample consisted of 250 women who were randomly selected from among the eligible females listed in the 1967 *Canal City, New York, City Directory*.

Format of Reading Materials Investigated. Materials were grossly classified as either books or magazines and within each classification, format was liberally defined to include all types of book bindings and frequencies of periodical publications. For example, no differentiation between paper-back books and hard-bound books was made. Also, no differentiation among weekly, bimonthly, or monthly periodical publications was made.

Comparability of the Two Groups. In a study such as this, unless specific variables are controlled, a researcher who compares teachers to non-teachers could erroneously be comparing a highly structured, homogeneous group to an extremely diverse, heterogeneous group. It is readily apparent that any differences observed from such a comparison could easily be attributed to the incomparability of the two groups and not due to the specific variables in question. Therefore, in addition to controlling for social status (11) and occupation, the comparability of the two groups was further increased by also controlling the following variables: sex-female, minimum age-21, minimum family income - \$5,500, city of residence-Canal City, New York, and access to a residential telephone.

Comparisons Made Between Teachers and Non-Teachers. When city of residence, minimum age, minimum family income and specific level of social status (11) are controlled:

Is there a relationship between the number of books read by adult females and each of the following variables?

- a) Occupation (teacher/non-teacher)
- b) Age
- c) Marital Status
- d) Income
- e) Education

Is there a relationship between the number of magazines read by adult females and each of the following variables?

- a) Occupation (teacher/non-teacher)
- b) Age
- c) Marital Status
- d) Income
- e) Education

Analysis of Specific Teacher Variables. When teachers as a group are investigated and minimum age, minimum family income, and city of residence are controlled:

Is there a relationship between the number of books read by female public school teachers and each of the following variables?

- a) Years of Teaching Experience
- b) Grade or Level Taught

Is there a relationship between the number of magazines read by female public school teachers and each of the following variables?

- a) Years of Teaching Experience
- b) Grade or Level Taught

DIFFICULTY OF OBTAINING DATA

Several investigators have attributed the paucity of research in this area of reading activity to the difficulty of obtaining reliable data. Studies by McDonald (13) and Graves (7) demonstrate the negative aspects of the mailed questionnaire technique. Research by Link and Hopf (12), Gray and Rogers (9), and others (4) indicate the numerous difficulties encountered in conducting personal interviews. Ennis (6) and others (10) have cited the difficulty of obtaining reliable data pertaining to book ownership and the degree of reading activity pursued when the respondent is interviewed away from his home. In an effort to circumvent the difficulties which previous researchers have encountered and to make maximum use of the amount of time and energy expended by both the interviewer and the interviewee, this investigator adapted the telephone survey technique which is commonly employed in consumer research. It appears that only two previous reading research studies (10, 13) utilized some form of this data collection procedure. Consequently, there were no available guidelines for its development and application. In an effort to develop both a methodological approach to telephone interviewing and a valid interview scale, four pilot studies were conducted.

As the result of the pilot studies, several changes were initiated in the actual investigation. First, the study was disguised as a television research investigation. Second, the interview scale was programmed so that respondents who had not read from a book during the twelve month period which immediately preceded this investigation were not subjected to inquiries which pertained to leisure reading activities. Programming the instrument also reduced the amount of time re-

quired to complete interviews with non-readers. Third, teachers were not informed that they were selected to be interviewed because they were members of the teaching profession. Fourth, in an effort to prevent the bias which could have resulted from any interaction between interviewed subjects and waiting-to-be-interviewed subjects, a "blitzkrieg" approach toward interviewing was employed. Finally, since some pilot study respondents had erroneously interpreted the telephone phase of this study to be a sales promotion campaign initiated by a publishing company, a personalized, explanatory letter was mailed to each subject before she was contacted by telephone. As the result of this letter, subjects not only expected the telephone call and understood the nature of the investigation, but many of the women were prepared with a list of television programs which they viewed regularly.

DATA COLLECTION PHASES OF THIS INVESTIGATION

Four women who were local residents of Canal City, New York, were trained to conduct the telephone interviews. Respondents who refused to cooperate in the initial phase of the investigation were telephoned long distance, person to person, by this researcher, a male.

Since non-respondents in previously conducted studies of this type were usually non-readers, this researcher avoided the use of substitute subjects and every attempt was made to contact the specific 450 women who were originally selected to be interviewed.

The total percentage of completed interviews, computed through the use of the number of acceptable completed interviews (394) and the maximum number of possible (404) interviews was 98.0%. Of the 46 subjects who were not interviewed, 8 refused to cooperate and the remaining women had either relocated, were too elderly to be interviewed, or were hospitalized.

VALIDITY AND RELIABILITY OF THE SUBJECTS' RESPONSES

In an effort to establish the reliability of the subjects' responses, a ten percent random sample of the interviewed subjects was telephoned a second time.

The percentage of agreement between the subjects' first and second responses on each of three questions which were taken verbatim from the original interview scale was used to ascertain the reliability of the subjects' original response. The results of these comparisons were newspaper readership 87.5%; book ownership 67.5%; magazine readership of 75.0%.

FINDING FOR THE SPECIFIC GROUPS INVESTIGATED

Several relationships were statistically significant at the .01 level as indicated by the Chi Square test of association.

Claimed readership of the "unavailable book" which were included in the interview scale did not appear to warrant excessive concern for the integrity of the respondents.

There is a significant relationship between the number of books read by adult females and occupation (teacher/non-teacher).

There is a significant relationship between the number of magazines read by the adult females and occupation (teacher/non-teacher).

There is a significant relationship between the number of books read by non-teachers and level of education.

There is a significant relationship between the number of magazines read by non-teachers and level of education.

The following findings also appear to be relevant to this discussion of adult reading:

Teachers read more books ($M = 8.69$, $Mdn = 6$) than non-teachers ($M = 7.87$, $Mdn = 4$) who enjoyed a similar life style.

Teachers who were in their twenties read more books ($M = 10$, $Mdn = 7$) than older teachers.

Teachers with 1-9 years of experience read more books than teachers who had accrued ten or more years of teaching experience.

Among all respondents, education was a major determinant of the number of books reported read.

Single women reported reading more books (teachers $M = 9.67$, $Mdn = 9$; non-teachers $M = 10.45$, $Mdn = 8$) than married, or widowed and divorced women.

An adequate evaluation of magazine reading requires both quantitative and qualitative analyses. In general, the quality of magazines reported read by the teachers was very different from the quality of magazines reported read by women who enjoyed a similar life style.

SUMMARY

The preceding findings relate to only the specific level of social status which served as the focal point of this investigation (teachers $N = 85$, non-teachers $N = 95$). However, findings which reflect the reading habits of the total number of subjects (394) interviewed are also of interest.

Although the profession can be proud of the fact that the vast majority of teachers (over 90%) interviewed were readers (one who has read or started to read a book for his own enjoyment during the twelve month period which immediately preceded this study), it must be concluded that as a group, these teachers were not active in the wider reaches of literate pursuits. A similar statement can be made about the general population. Also, only 70% of the women in this group were designated as readers.

The television pretext which was employed in this investigation enabled this researcher to obtain additional insight into the respondents' attitudes toward leisure reading. Questions which probed the "most favored" and "least favored" leisure activities of respondents revealed that many adults have a negative attitude toward reading books for personal enjoyment.

Approximately 50% of all the teachers ($N = 177$) and 54% of all the non-teachers ($N = 217$) reported that they preferred less demanding forms of leisure activity to reading books.

In summary it can be stated that this evidence places even greater emphasis upon the fact that the vast majority of our children have very little contact with adults who are enthusiastic about reading and who actually pursue reading as a favored use of leisure time.

It is obvious that most adults are not setting a desirable example for our present school population. The parent who spends more time watching television than reading and the teacher who cannot talk to her students about enjoyable books which she has read, are both guilty of failing to generate enthusiasm for recreational reading (3). In fact, since such a great proportion of our adult population prefers other forms of leisure activity, perhaps a negative attitude toward the reading of books for personal enjoyment is being established.

In view of the fact that the values which children have for reading are influenced by the values which adults have for it, the implications of this situation are readily apparent.

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Athletic Department Reading and Study Skills Program—A Model in Search of Other Applications

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There is increasing demand for personnel services to more effectively assist the integration of the various aspects of the student's life in ways which harmonize his roles as student with what he continually discovers about himself and learns about others with whom he must deal and compete. This need will require greater accessibility of the services, with more immediacy, flexibility, and, likely, less visibility. Innovation and experimentation at all service levels will be necessary. The personnel worker who ventures into such a setting will be forced to work as a generalist, while developing competence in several personnel specialties. He will be counselor, educational skills expert, adviser on scholastic questions, confidant and friend, as well as information source on whatever in the institution may or must affect the student's education and growth.

The increased need for innovation among educational skills specialists and counselors coincides, interestingly enough, with the arrival of mass education as an industry at the college level, where family and societal pressures force post-high school education upon the majority of college age youth. It is further underscored by the recent urgent efforts of institutions of higher learning to accommodate in more humane ways a great variety of students considered disadvantaged, for whom the college degree has become the essential means to job security, economic stability, and human equality.

Those of us who work with these college freshmen now on our campuses have come to discover that a great many of them are improperly equipped for effective college work. Their inadequacies are especially apparent when one looks at the basic skill levels where approximately one-third of them are not as well trained in reading (that is, rate, comprehension, retention, and vocabulary) as is the average high school senior. In fact, about 10 percent are below the skill level of the average ninth grader.* Thus, a significant proportion are in college without many of the essential tools for dealing with the demands of the new environment.

There is doubt among students, faculty and administrators that the student personnel profession can muster the creative competence to successfully perform its important educational function under these

* Based on data gathered at the Reading and Study Skills Center, University of Minnesota, Alton L. Raygor, Director.

circumstances. It is clear that counselors and skills specialists will be judged in the last analysis on their capacity to "produce the goods" in specific and concrete situation with a variety of identifiable groups of students.

In this sense the education skills worker joins all educators, students and faculty, in the work of reordering institutions of higher learning in ways which prohibit the processing of masses of students through four years of college without the opportunity for experiential involvement and intellectual excitement, ingredients which are essential to a quality education.

These observations provide the context for the following description of an experimental personnel services model which commands our attention today:

THE MODEL

Four years ago the Department of Intercollegiate Athletics and the Student Counseling Bureau at the University of Minnesota together began the task of developing a personnel services model capable of serving the educational and growth needs of one easily identified community of students within the campus: the student-athlete. By joint appointment they established the position of Scholastic Counselor, out of which has evolved a comprehensive educational skills and counseling service bearing many of the distinctive characteristics sought in student personnel services today. In emphasis, the service is preventive, developmental in philosophy, and individualized in operation. Its several phases are designed to provide a quality educational experience in a personalized manner for each of approximately four hundred student -athletes. To reflect the variety of services currently provided through the Scholastic Counselor, this title was recently changed to Educational Skills Counselor.

Phase I

A reading and educational skills program, designed to equip each student athlete to perform scholastically at the level of which he is intellectually capable, operates two or three evenings a week from seven-thirty to ten o'clock throughout the entire freshman year. Study occupies a major portion of the evening where student-athletes give attention to regular coursework assignments. Supporting the basic study hall emphasis are satellite tutor-seminars in subject areas common to most student athletes in the program. In these seminars there is competent faculty focus on the structure of knowledge in the respective discipline, the specific ordering of the courses through which that knowledge is taught, as well as the means by which learning is achieved and measured.

On specified nights groups of twenty to twenty-five student-athletes are called out of the study and tutor programs to work with the Educational Skills Counselor on educational skills improvement. On the

basis of diagnostic tests, skill weaknesses are identified and appropriate programs of skill improvement are individually prescribed. Attention is devoted to reading rate, comprehension, and retention skills, note-taking and underlining a text, writing exams and term papers, vocabulary and spelling. Obviously, there are as many plans of attack on skill needs as there are student-athletes in the program.

Phase II

The Educational Skills Counselor provides scholastic supervision and program advising during the day. Here attention is given to details of registration, choice of courses, credits, transfer and degree requirements affecting the student-athlete in each college of the University. This phase is designed to complement the service continuously provided through each college's advising and supervisory staff. By this effort the opportunity for the student to make inappropriate decisions is minimized.

Phase III

The Educational Skills Counselor, a certified psychologist, provides personal, vocational, and general psychological counseling for all student-athletes by appointment through his day calendar. In support of this counseling service there was developed a cadre of one hundred and eighty-five graduate "M" men, former athletes at the University, who pledged their time and professional talents to assist student-athletes at the point of their struggles with a choice of vocation and employment upon graduation. Through on-site visits to appropriate businesses, practices, and work locations represented by the "M" men in every occupational category the student-athlete has ready access to the area of the world of work and professional life into which he hopes to venture. These on-site appointments are arranged through the Educational Skills Counselor.

Phase IV

The work of the Educational Skills Counselor invariably involves the maintenance of mutually satisfying relationships between the Department of Intercollegiate Athletics and the appropriate administrative and scholastic units of the University in which student-athletes are found. He has the tasks of sharing with scholastic committees the supervision of each student-athlete's progress toward a degree as well as of gathering and disseminating relevant information on student-athlete's problems, achievement, educational and social growth, degrees, graduation, and placement. He continually educates the Athletic Department staff and other University personnel on ways in which college procedures, curricula, services and practices aid and/or hinder the student-athlete's educational efforts.

MODEL'S EFFECTIVENESS

The experimental program described has now been in effect for three years. The signs which point to the model's effectiveness are

these: 1) Eighty-seven percent of the freshmen student-athletes served during the past three years, in assessing its worth to them, gave the service the highest rating on a five point scale while only two percent assigned the lowest or next to the lowest rating on the scale; 2) better than three-out-of-four freshman student-athletes by actual achievement exceeded their predicted end-of-year grade point averages; 3) the mean grade point average of the freshmen student-athletes, as a group, exceeded the mean grade point average for all male freshmen in the University by approximately one-half grade level; 4) the persistence probability for student-athletes is currently .79 while for non student-athletes in the University it is currently .53; 5) ninety-eight of the three hundred and twenty-five student-athletes of this past year qualified for the prestigious Williams Scholarship based on academic as well as athletic excellence, the highest number of student-athlete candidates for any given year in the history of Athletic Department; 6) Athletic Department staff and University faculty encourage and support the continuation of this experimental service, specifically commenting on the integrity of the service as it affects a particular student and his professor or adviser.

MODEL'S ADAPTABILITY

The worth of this personnel model, in terms of its adaptability, is illustrated by the University's recent implementation of it in other academic settings within the campus, most notable of which are in the Institute of Technology and the program of Medical Technology. Its potentialities are further illustrated by the fact that five other colleges and universities have, within the past year, been assisted in similarly developing this model of personnel services for identified communities of students within their respective campuses.

CONCLUSIONS

As an experimental venture it has "produced the goods" in terms of student-athlete satisfaction, achievement, and persistence in college. It is judged to be helpful to the learning processes by both students and faculty. In one setting, the University of Minnesota, the model is found to be functionally desirable, educationally and psychologically defensible, and economically capable of implementation among other communities of students and faculty within the campus. It is a model in search of other applications.

Comparison of Four Techniques in a Reading Laboratory

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Today, as never before, the need exists for most of our citizens to acquire greater proficiency in techniques of reading. Most job opportunities demand an individual who can read and understand what has been read so that he can be trained and re-trained as the technology progresses. Technological advances have been swiftly changing, and there appears to be no slowing down of these advances in the future. The only foreseeable changes are in the direction of exerting greater demands on the individual to be better informed and more capable of adjusting to the occupations, professions, and to the world. These technological advances coupled with the "population explosion" and the greater holding power of our public school systems have resulted in a significant increase in enrollments in our colleges and universities. The influx of college and university students has automatically created an influx of those with ability to be successful but who may fail because they lack proficiency in reading. There are also those students who desire to become more proficient in reading. Many of the colleges and universities have recognized the need and accepted the challenge by developing college reading improvement programs during the preceding two decades. However, all are aware of the multitude of problems associated with conducting a reading improvement program. A limited enumeration of these problems would include the number of students, the variability in skill development and proficiency among the students in a class, the duration of the course (often 7 or 8 weeks), and the limited number of instructional periods (often 2 per week or a total of 16 with 2 of these periods used for pre- and post-testing).

The Reading Improvement course at The University of Oklahoma is designed to accomplish three major purposes: increase the rate of reading, improve comprehension, and develop flexibility in reading. Instruction has consisted primarily of group instruction with the students having the opportunity to gain added practice in applying the reading skills through the use of equipment (pacing devices) and materials in the center. The amount of time spent in practice was optional to the students. Some students were diligent and consistent in scheduling practice sessions while others devoted little or no time to practice.

STATEMENT OF PROBLEM

The study was designed to determine whether added practice sessions, varied according to amount of practice, frequency of practice, and intervals of practice, resulted in significantly greater gains in reading proficiency for one of four groups (no effort was made to separate the influence of the effect of amount, frequency, and intervals of practice).

Usually, an assumption (often false) is made that college and university students have developed the basic reading skills and will become proficient in the application of these skills through practice. The purpose of this study was to determine an effective practice schedule which was practical to include in the requirements for the reading improvement course.

DESIGN

The students enrolled in four sections of the Reading Improvement course at The University of Oklahoma during the 1967-68 academic year were used as subjects for the study. The students were not selected and assigned to a particular group, but were in the designated group because they had elected to enroll in a section offered at a time convenient to their schedules. Each class usually has two one-hour periods of group instruction per week. Group A was composed of 9 students who received one and one-half hours of group instruction and the remaining thirty minutes were used for individual practice on a pacing machine. Group B was composed of 8 students and, in addition to the two hours of group instruction per week engaged in two one-hour periods of individual practice on the pacing machine per week. Group C was composed of 9 students who, in addition to the two hours of group instruction, practiced on the individual pacing machines for five twenty-minute periods per week. Group D was composed of 14 students who received two hours of group instruction and a suggestion that they practice individually on the pacing machines at least two hours per week. No effort was made to determine whether any members in Group D engaged in the suggested practice sessions. The *Iowa Silent Reading Test* was administered at the beginning and conclusion of the course, Form CM the pre-test, and Form DM the post-test. The *Iowa Silent Reading Test* is designed to measure reading achievement in several areas of reading: subtest 1A measures rate and 1B measures comprehension, subtest 2 measures directed reading skills, subtest 3 measures comprehension of poetry, subtest 4 measures knowledge of word meaning, subtest 5 measures sentence meaning, subtest 6 measures paragraph comprehension, and subtest 7A measures skill in using the index, while subtest 7B determines the ability to select key words as an aid to locating information.

TABLE 1
ANOVA FOR GROUP A, TREATMENTS BY SUBJECTS

Source	df	Sums of Squares	Mean Square	F-Ratio
Treatments (T)	8	3,073.4	384.18	1.843 (n.s.)
Subjects (S)	9	2,468.0	274.22	1.315 (n.s.)
T X S	72	15,010.3	208.48	
Total	89	20,551.7		

Table 2
ANOVA FOR GROUP B, TREATMENTS BY SUBJECTS

Source	df	Sums of Squares	Mean Square	F-Ratio
Treatments (T)	8	3,801.2	475.15	1.978 (n.s.)
Subjects (S)	8	1,352.4	169.05	less than 1 (n.s.)
T X S	64	15,374.6	240.23	
Total	80	20,528.2		

RESULTS

The data of the experiment were analyzed in several ways. The first tests were Analyses of Variance (ANOVA) for each of the four experimental treatments, in a Lindquistian "Treatments by Subjects" design (Lindquist, 1953). Tables 1 through 4 present the results of each ANOVA. In brief, only the main effects for treatments for experimental groups C and D were significant (p less than .001). From these analyses we can conclude that: Teaching methods for Groups A and B have no effect on subtest gain scores, while methods for Groups C and D *do* have an effect. In order to examine this effect more closely sign tests were performed on each subject within Groups C and D.

Within Group C, subtest 1A shows gain scores greater than 20 points (which was an arbitrary "cutting score") with $p = .001$, while subtest 7B shows gain scores less than 10 points, with $p = .055$. This indicates that most of the effects for Group C (though by no means all of the effects) were due to a differential IMPROVEMENT OF PERFORMANCE ON SUBTEST 1A, and a NEGATIVE (or perhaps

Table 3
ANOVA FOR GROUP C, TREATMENTS BY SUBJECTS*

Source	df	Sums of Squares	Mean Square	F-Ratio
Treatments (T)	8	14,702.8	1,837.85	6.000**
Subjects (S)	9	5,118.3	568.70	1.857
T X S	72	22,051.5	306.27	
Total	89	41,872.6		

** p less than .001

* The data of this ANOVA were transformed by adding a constant to each gain score for each subject in order to reduce the effect of "negative gain scores" in the analysis.

Table 4
ANOVA FOR GROUP D, TREATMENTS BY SUBJECTS*

Source	df	Sums of Squares	Mean Square	F-Ratio
Treatments (T)	8	17,495.0	2,186.88	8.900**
Subjects (S)	14	2,590.0	185.00	less than 1.0 (n.s.)
T X S	112	27,503.0	245.56	
Total	134	47,588.0		

* The data of this ANOVA were transformed by adding a constant to each gain score for each subject in order to reduce the effect of "negative gain scores" in the analysis. This procedure is legitimate insofar as it does not affect the *relative* standings of the means (they are merely increased by the amount of the constant), and has no affect whatever on the variance of each Teaching Method.

neutral) EFFECT ON SUBTEST 7B. It is not possible at this time to provide an exact explanation of why this should be so, however.

Within Group D, a different effect of teaching method was found. If we consider the same criteria for improvement vs. impairment of performance as we did for Group C, we find that subtest 5 showed less than or equal to 10 points gain ($p = .059$) and subtest 6 showed less than or equal to NO GAIN AT ALL (p less than .004). This means that performance on subtest 5 was relatively poor in Group D, but this method actually IMPAIRED performance on subtest 6. Subtest 1B showed more gain among individual subjects (who improved 20 or more points), with a p of .059. At this point, one can see the differential effects of Groups C and D: Methods used in Group C act to improve performance on subtest 1A and hamper it on subtest 7B, while the methods used in Group D acts to improve performance on subtest 1B and hamper it on subtests 5 and 6.

A Kruskal-Wallis One-Way ANOVA was performed on the gain scores as indicated by the "Median Standard Score" for the *Iowa Silent Reading Test*. The rationale for this is to be found in the test manual; this score is termed, "a measure of average silent reading ability." (Parenthetically, this statement is patently false, inasmuch as a *median* score, and not an *average* or *mean* score, is used). For all groups compared to each other, the Kruskal-Wallis test is a desirable one. It makes no assumptions about the underlying nature of the distributions with respect to the variance or skewness of the scores (Siegel, 1956).

The Kruskal-Wallis analysis shows that there is a significant difference among Groups A, B, C, and D with respect to the ranked scores for each method, with p less than .05. This indicates that the different teaching methods do indeed cause different amounts of gain scores across the subjects of this sample. Mann-Whitney U-tests, the non-parametric analogues to the t -test between two independent samples (Siegel 1956), were performed among the different teaching methods. This analysis yields only one significant finding: that the teaching

method used for Group C is superior to the method for Group D ($p = .05$) with respect to median standard gain scores only. It was also determined that the rank order of groups was C, B, A, and D; that D was the worst with respect to the gain scores as indicated above; and that there were no differences among the other groups ($C = B = A$). It should be noted that this test (and the others predicated on the median standard gain score) does not use all of the data in these samples, and is thus relatively insensitive to any "real" differences which might be lurking in the data.

In order to correct this, the TOTAL GAIN SCORE for all subjects in each group was analyzed by the Kruskal-Wallis test. With this refined measure, which uses *all* of the data of the samples, it was discovered that the groups differed significantly among each other, with p much less than .001. Inasmuch as a different set of data was used (*all* of the gain scores instead of the *median* gain scores), this finding may be used as confirmation of a real difference among these groups.

An attempt was made to determine which of the groups were significantly different from the others. Table 5 shows Mann-Whitney U-Tests among the groups.

The data from Table 5 yield the following conclusions: Group A may be somewhat better than D (although this did not reach the $p = .05$ level of significance), and Group B is superior to both C (less than .05) and D (p less than .02).

A Chi-square test was made on total gain scores to determine if sex differences existed among members in each, and in all, groups. None were found to exist.

CONCLUSIONS

1. Among the four teaching methods examined, the methodology for Group D was the least effective.
2. Among these four teaching methods, the method employed for Group B is more effective than the methods employed for Groups C and D. This is true when all subtests are considered, but not true when only the reading rate is isolated. Students in Group C made significant improvement in rate of reading over the other groups.

Table 5
MANN-WHITNEY U-TESTS, TOTAL GAIN SCORES, ALL GROUPS COMPARED GROUP

A	B	C	D
GROUP B 32.5	---	---	---
C 32.5	16.0**	---	---
D 44.0*	21.0**	72.0	---

* A group superior to D group, $p = .10$

** B group superior to C group, p less than .05

*** B group superior to D group, p less than .02

3. Methods utilized for Groups A and B appear to have about the same degree of effectiveness. Therefore,
 - a. If time is a factor and is at a minimum, the use of procedures used for Group A is suggested (2 hours vs. 4 hours weekly).
 - b. Many short practice periods as used with Group C with the pacing machines do not appear as effective as a few longer ones. This is not proved, but suggested by the data.
 - c. Unsupervised practice as used with Group D is to be avoided.
4. The data suggest (from ANOVA's and t-tests of Groups C and D) that different reading skills may be improved by different practice methods. This is an area which should be subjected to further study.
5. Significant improvement was not found to exist in either of the groups which favored either sex.
6. Further research is suggested on the following questions:
 - a. As the amount of total time that the pacing machine is used increases, do scores on the *Iowa Silent Reading Test* increase proportionately? Or is there some optimal amount of time?
 - b. As the number of exposures (practice periods) to the pacer increase is there a proportionate increase in *Iowa Silent Reading Test* scores? Or is there some optimal number of exposures?
 - c. What would be the effects of massing versus spacing of practice with the pacer? Is there some optimal spacing that would result in the highest gain scores?
 - d. Are there different student characteristics which would result in differential gains by using the pacer or other devices? For example, do those scoring lowest on the pre-test improve most or least with a given method?

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American Language Skills: An Integrated Reading, Writing, Speaking, and Listening Program

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Southwest Minnesota State College, a four-year, liberal arts and technical college, opened in September, 1967, with 500 freshmen as charter class. The college will attract a majority of its students from a 30,000-square-mile corner of the state, primarily rural in character, but the percentage of out-of-state and foreign students will increase each year. The College Board declined to set curricular guidelines, and, instead, advised that a charter faculty be sought who would bring with it a strong vision of what education could become in the future. Thus motivated to be innovative, the task of the charter faculty to create four years of liberal arts education was freed from the limitations of tradition, habit and presupposition. We had the opportunity to approach the problems of teaching native language facility without pressure to separate linguistic behavior into English Departments, Speech Departments, Linguistic Departments, Reading and Study Skills Clinics. Therefore our first concern was somewhat more basic than, "What text shall we use for Freshman English?"

The interdependence of reading and writing expressed by the vague but useful generalization, "Those who read a lot write better than those who read little," has been given lip service for many years but little attempt has been made to fully exploit the values implied. The interdependence of speaking and listening and of oral-aural and written-printed uses of language is not immediately apparent, and the teaching of native language facility has for the most part ignored the progress made by the teaching of foreign language which takes advantage of the reinforcement gained through oral-aural experience. We conceived a program which tries to focus on language facility by teaching reading, writing, speaking, and listening simultaneously, and named it American Language Skills.

The general principles of linguistic communication which apply to all four uses of language should be integrated and coordinated to gain emphasis and reinforcement. For example, to an unsophisticated writer, whatever he writes is organized because that was the way it occurred to him. However, when exposed through a coordinated reading experience to the poorly organized writing of someone else, the confused student quickly learns to distinguish between "private" or individualized organization and "public" or standard organization. The American Language Skills course is required of all degree-bound

students, and, since we consider language facility a behavior skill, it is of utmost importance that a full academic year be provided. Behavior patterns formed through seventeen years of practice cannot be changed in three months. Many people in English Departments with literary backgrounds consider the usual Freshman English course to be a waste of time. They are right but do not always know why. Seldom is enough change gained in the students' linguistic habits to warrant three months' work. Intensity and amount of writing are not as significant in securing habit change as is a consistent, steady meeting of the demands of clear, concise and effective communication over an extended period of time. Nor does concentration on one area of linguistic environment such as writing secure significant changes in habit when old habits persist in other areas.

Our Charter Class enrolled in twenty-one sections of American Language Skills was limited to about twenty students per section. One hour per week of the four hour course was devoted to some form of formal instruction in reading in a classroom situation. The other three hours were given to writing, speaking and listening. The instructional hour in reading was used to disseminate basic information about the reading process, to provide guidelines on the use of instructional and practice materials, hard and software, to administer tests and practice drill, to inform the students about what kind of progress they could and should be making, and to take up problems which concerned a majority of the students. Since we were trying to individualize instruction as much as possible, the repetition caused by twenty-one sections meeting one hour per week was considered a waste, so we changed in the second quarter to a mass lecture for the general material. The rest of the work students did on a self-scheduling basis in the Reading Center kept open fifty hours a week. The individualizing of instruction was managed by installing in the Reading Center wall cabinets containing racks of plastic "tote" trays. The student would enter the Reading Center and check with the instructor who would issue the unit of work appropriate to the student's progress. When finished, the work would be placed in the instructor's basket and be checked for accomplishment. The instructor would then place the evaluated work, comments, and the next unit of work in the tote tray with that particular student's name on it in the cabinets. From this point on, the student need only go to his tray and do the work he found there. The instructor was called upon only when a particular student had difficulty understanding what to do. Thus the student could progress at his own rate, slow down or speed up his work, and alter the amount of time spent according to other varying demands on his total available time.

Some difficulties encountered resulted from a lack of materials. Not only is it necessary to create our own textual and practice materials in

each of the linguistic functions, but very few reliable tests exist in writing, speaking and listening. The tests which are available in reading do not readily lend themselves to our particular set of goals and methods of organization so we have had to "make do" with what is available. A friend of ours in the field says, "When you want an indication or information, make tests quick and dirty. Don't try scholarship until you have the time and facilities to validate materials and results." The American Language Skills Program of Southwest Minnesota State College is not yet ready for scholarship.

To evaluate the reading progress of the student, we administered the Triggs Upper Level Survey Form "A" at the beginning of the Fall Term, 1967, to all entering students. To provide some kind of control group, we asked for volunteers who would take the writing, speaking, and listening portions of American Language Skills, but would not take reading except for general achievement tests. Thirty students volunteered who thought they could read well enough. The fact that only about fifteen of these volunteers survived the first year of college, and of those, only eleven took all of the tests needed for comparison may in itself be significant. At the end of the Spring Term, Triggs Upper Level Survey Form "G" was administered to give us some vague idea of possible gain or loss. The tables below include only those 283 students who through the school year took all of the various kinds of testing and had assuredly gone through all the work units. The figures for timed comprehension, vocabulary, and paragraph comprehension indicate percent of correct answers.

	# Students	Rate	Timed Comp.	Vocab.	Paragraph Comp.
TRIGGS, FORM "A" (All entering)		300 wpm	74.8%	74.3%	78.9%
Test Group	283	302	72.6	74.8	75.9
Control Group	11	337	87.0	75.2	89.0
TRIGGS, FORM "G"					
Test Group	283	744	66.3	83.7	77.1
Control Group	11	593	67.0	79.4	68.0
INCREASES					
Test Group (283)					
Triggs, "G"		744	66.3	83.7	77.1
Triggs, "A"		-302	-72.6	-74.8	-75.9
		+442	- 6.3	+ 8.9	+ 1.2
Control Group					
Triggs, "G"		593	67.0	79.4	68.0
Triggs, "A"		-337	-87.0	-75.2	-89.0
		+256	-20.0	+ 4.2	-21.0
Comparison of Progress					
Test Group		+442	- 6.3	+ 8.9	+ 1.2
Control Groups		+256	-20.0	+ 4.2	-21.0

These figures are merely an approximation of beginning and ending competence in some areas of reading skill, and do not refer in any way to the various other aspects of reading which were a part of the program. For example, with the aid of members of the other departments of the college, we made up reading lists in science, social studies, literature, physical education and technology for those students who found the general reading material uninteresting and for those who had begun to develop a major interest. We hope that this meager beginning will form the basis for future clinics or workshops for advanced students who find themselves overwhelmed by the reading demands of any course of study. The student should be adequately prepared by the freshman program for general textual reading, but programs in math, science, computer science, and technology have not only a specialized set of communicative symbols, but at times even an individualized set of referends. Thus, when any program of study transcends the skills of general reading ability, small group clinics or workshops, or even individualized programs can be set up to help the student gain the skills he needs to succeed. A further benefit of this type of program is that it automatically covers the "study skills" area, without the onerous labels and negative attitudes that such labels engender.

The figures also do not refer to the gains in reading made by establishing relationships among reading, writing, speaking and listening, nor do they even suggest the gains made in these other aspects of language use. Writing and speaking have always been subjectively evaluated, and we have not yet developed the objective tools to measure these gains. The American Language Skills concept has engendered a developing program which in its infancy must meet many challenges, but the gains we have been able to measure, and faculty and student response have been encouraging. We plan to continue developing the program by incorporating those positive factors such as materials, methodology, organization, and evaluative instruments which the program helps to discover.

What Does Research Really Say About Study Skills?

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Once a speaker at the University of Minnesota's Cap and Gown Day Convocation lamented for an hour about the evil students of today who dared to underline in their textbooks. For her, to place a mark on a page was to commit the worst sacrilegious act. She would be grossly saddened to discover that a recent study (Willmore, 9) demonstrates that underlining is the most effective study method.

Sadder still is the fact that many of the listeners believed her and, as a result, turned their backs on using an effective study technique. Most students tend to believe what is told them, especially if the person speaking is a professional. Yet the ethical obligations of the teller are great. The speaker at the graduation ceremony undoubtedly had good intentions; however, she was expressing only her biased and unsupported opinion. One wonders how many professionals in the study skills field are espousing similar biases which are, likewise, not supported by research findings.

There is money to be made in the study skills business. The least one can do, while reaping the profits, is to present the facts. The following rationalized half-truths are not sufficient justification for questionable practice: 1) If I tell them the facts I can't maximize the hawthorne effect; 2) Everybody is different, so we must find out what works with which people; and 3) If I give them the facts I will contaminate their choice of the study method best suited to each of them. We have all heard at least one of these rationalizations by some professionals in the field. One is led to suspect that study skills specialists attempt to glamorize the field with quasi religious and mystical beliefs that something, somewhere out there in the great unknown is going to produce in every person a unique ability to pick the correct study method and, as a result, to be enabled to remember facts and details for long periods of time. Such wishful thinking is passed on to a public who, in the tradition of Barnum, gobbles up every golden word.

Several books have been published on how to study. The writers read these books in the hope that one book, suitable for use with college students, could be found. At the same time, we observed that students at our university react very negatively toward a "here is how to do it" philosophy. They want to know what the evidence suggests about study skills. Undoubtedly, this is due in part to the college tradition of teaching them not to accept on face value any statement or assertion routinely made by anyone in the academic community. This critical attitude has led students to be insulted by the typical

study manuals assigned them. They want evidence, and most study manuals do not provide a broad data base in support of their assertions, except where some minor point of seemingly universal and unquestionable application is made.

It is of interest here to look at what study manuals do espouse regarding study skills and to observe both the nature and extent of the research cited in their support. By this means one can begin to identify the dimensions of the metaphysical nonsense transmitted as fact which offends both professional ethics and student intellect. While several aspects of study skills are worth reviewing in this manner, we will focus on two crucial areas, study method and retention-review, which are probably central to successful grade getting.

STUDY METHOD

Morgan and Deese (4) choose the SQ3R (Survey, Question, Read, Recite, Review) method of study. They claim the "Survey Q3R program has been soundly tested." Unfortunately they present no studies to support their assertion. They do cite a well-known study by Spitzer, but fail to take into account that this study dealt only with recitation, not SQ3R.

Pauk (5) recommends a program called the OK4R method of study which he says is based in part on the SQ3R method. He presents no research data to support the method. Kalish (2) also recommends a modification of the SQ3R method. He states "the SQ3R method did not originate out of the personal teaching experience of only one or a few men, but is the result of many years of careful research, questionnaire studies, and experimentation." Unfortunately he does not honor the reader with some of this wealth of data.

Smith (6) presents a method called SQ4R, again an off-shoot of the SQ3R method. The fourth R stands for rite (write). Smith does present research. However, the majority of the studies he cites do not deal with the SQ3R method, but only with recitation, survey, or review.

Other books could be examined in this way. However, as Willmore observes, the vast majority of authors of how to study manuals recommend SQ3R or a variation of the SQ3R method. The question is: what about the wealth of data, seldom cited, which supposedly supports the SQ3R study method?

Willmore answers the question in unequivocal terms: "The survey step has not really been tested, and studies which are relevant are unimpressive in supporting the value of survey. Questions can be helpful, but weaknesses were found in many of the studies; and in general, it would be difficult to generalize to other settings since so much depends on type of material and where the questions are placed. The value of recitation and review is well established, but there is no evidence that they are more effective if applied in the SQ3R manner.

Again, so much depends on the difficulty of the material that generalizations can be misleading. Only two studies examined SQ3R as a total method and neither one yielded positive results in support of the method. Overall, the evidence showing the efficiency of SQ3R is both sparse and unimpressive." Wark (8) has also made a careful review of studies on SQ3R and concludes: "Survey Q3R seems to be supported by tradition, rather than a serious consideration of the data on productivity."

These criticisms are not directed toward Dr. Robinson, author of the SQ3R method, for having helped the development of systematic study methods appropriate to college students. The observations do raise serious questions about the practice of study skills professionals who, without carefully assessing the method's effectiveness with specific groups of students, uncritically assert its appropriateness for all college students.

Where does this leave us? What do we tell students? Is there any research available that can give us guidance in selecting a method of study to recommend to students? The writers know of only one study which compared the effectiveness of study methods and where adequate methodological and statistical controls were applied. Willmore compared SQ3R, Reading, Outlining and Underlining. Her findings reveal that underlining resulted in better short-term and long-term comprehension. In addition, the underlining method took considerably less time than either outlining or SQ3R.

It is indeed discouraging to find so little research conducted on the relative effectiveness of study methods. We can only hope that more attention will be focused here in the near future. At present it must be concluded, however, that the SQ3R method of study does not warrant the emphasis it now receives.

RETENTION AND REVIEW

Morgan and Deese state that typically students "review at the wrong times and they don't review enough." They feel students should review several times: once immediately after the first study period, followed by two additional short reviews, with a final review before examinations. No studies are presented to support this recommended procedure.

Voeks (7) presents many studies on review and retention. She suggests that review before the examination can be effective if a student has previously mastered the material, but that last minute cramming is not effective. However, no evidence is cited in support of the latter statement.

Pauk suggests the same procedure as Morgan and Deese and Voeks: immediate review, a final review with no cramming. One study was presented to support the value of immediate review. No other studies were mentioned.

Smith emphasizes his modification of SQ3R as the system which increases retention. He feels that cramming leads to "confused thinking on examinations." No research is presented in support of his views.

All of these study experts generally subscribe to overlearning, spaced practice, recitation, and review. We cannot disagree with this advice. But do they present the whole story? It should be noted that, except for Voeks, none of the writers cite studies which examine the effect of review on the retention of textbook material. Crewe (1) found that only seven studies have been conducted using textbook type material while considering review strategies. Most of these studies failed to control for the effects of time, and they all generally conclude that spaced practice is most effective. In contrast, MacKay (3) and Crewe found that massed study was more effective when time was controlled. Interestingly enough, in both studies the massed study session was a first exposure study situation which could be considered as a cramming session. Although MacKay's findings have been ignored in the literature for nearly fifty years, they are confirmed by Crewe.

We would conclude that study close to the time of examination is probably more productive than at any other time, and we suggest that students are done a disservice when told that a final review or cramming session before an examination is not effective.

From the review of these five study manuals, it appears that students are not presented with sufficient research data on which to base valid decisions about their study behavior. This situation calls for the development of a manual on study methods which presents the relevant data while refraining from pontificating about pet methods and techniques. In addition, there is need for a book which summarizes all research on study skills to serve as a reference tool for all professionals engaged in the study skills field.

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1968 Review of Research on College-Adult Reading

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INTRODUCTION

The bulk of the reports included for treatment in this review have appeared since September, 1967, the time last year's review (19) was being prepared. Several reports which appeared shortly after preparation of the 1966 review (18) but which were not available to this reviewer at the necessary time, and a few which had been otherwise overlooked previously, have also been included. The number of articles and reports found pertinent for purposes of this year's review and listed in the bibliography, a total of 179, is the largest number to have appeared in these annual reviews. Part of the reason for this is that, in addition to the 1967 Yearbook of this Conference (157), the 1966 Yearbook (156), which was not yet available at the time of last year's Conference, has also been included; and both of these Yearbooks contained a number of pertinent reports, as has been true of the Conference Yearbooks previously.

As in the past, the reports included in this review have been restricted rather closely to those which have relevance for reading at college and other adult levels. Treatment of various reports has also been roughly organized under the five indicated major headings.

PROGRAMS

Several reports of surveys of college and other adult reading programs appeared during the past year. Two of these were national in scope (1; 69); three were state-wide ((114; 171; 175); and one was concerned with adult basic education programs on a nationwide basis (135). Adams (1) briefly reported, at this Conference last year, an analysis of forty returns obtained with a questionnaire survey of tutoring procedures in college reading clinics. Pre-college services seemed to be involved mainly; but three of twenty-four clinics offering tutoring services reported college students only being served. Of the 246 institutions which responded to Geerlofs and Kling's survey questionnaire (69), sent to 336 institutions, 210 reported they were conducting developmental reading programs for college students; and 70 reported they were conducting programs for business executives. Considerable variation in practice was found; but the most common type of practice seemed to be a short course involving twenty to twenty-eight hours, group instruction, pre- and post- testing with a standardized reading test, use of one or more workbooks or reading passages with comprehension checks and one or more mechanical pacers, inclusion of assigned homework, and being free and voluntary in nature. Patterns

found were similar to those shown in earlier surveys, with four of the six leading tests used (Nelson-Denny, DRT, Cooperative, and Iowa) being the same as in earlier studies. A trend to a greater use of pacers rather than tachistoscopes was noted; and five of the ten leading workbooks reported used were new since earlier surveys. Of the 47 of the 53 Florida institutions of higher learning which responded to Lowe's mailed survey (114), 37 reported having reading improvement programs, with 16 offering programs for persons other than students also, academic credit being given by 16, fees being charged by 15, and from 20 to 2,228 students reportedly involved in the programs of various schools during the 1966 fall term. The questionnaire survey by Wade (171) of 37 Illinois junior colleges revealed that 19 of the 33 responding had reading programs, with most programs being operated by English departments, students volunteering for programs in six colleges and being placed in programs in 16 schools, and 17 colleges giving credit for reading courses. Weber (175), as a result of a study of five Michigan community colleges, concluded that remedial English classes which concentrated on teaching of grammar were usually unsuccessful and recommended that reading improvement be an integral part of remedial English, preceding any other remedial work. Otto and Ford (135) obtained information on 367 adult basic education programs from state directors in 36 of the 50 states. Among trends indicated were fewer immigrants in newer programs, fewer dropouts before age 16, more men being included, and few programs providing instruction for actual illiterates.

Reading, study skills, or related programs were involved in a number of reports. (2; 13; 15; 20; 35; 42; 43; 51; 52; 69; 71; 75; 77; 83; 84; 85; 94; 96; 106; 107; 108; 111; 115; 117; 118; 131; 154; 160; 165; 172; 179) Describing a specific program seemed to be the main intent in relatively few instances, with reporting of assessment of results or evaluations with specific programs appearing to be the main purpose in a considerable number. (2; 15; 35; 51; 71; 75; 84; 85; 94; 106; 107; 108; 115; 117; 131; 160; 171) An earlier report of Coffman's study (35), as a result of which he concluded that a reading program with speed and accuracy emphasis was not effective in increasing verbal aptitude scores of the type of students used in his study, was cited in last year's review (19). Durkee (51) found that the grade-point averages of two control groups of University of Southern Mississippi freshmen who had been placed on academic probation because of low grades were slightly higher ((though not significantly so) at the close of a study than were those of an experimental group of probationary freshmen who had participated in a short-term study skills course. Glass (71) found that experimental groups whose predicted rate scores were lower than their actual pre-training rates made significantly greater rate gains in a twelve-weeks program than did an experimental

group whose predicted rate scores were not significantly lower than their actual pre-training rate scores, although both groups made significant gains in the program and significantly greater ones than did control groups. Higgins and Gage (84) found that almost all of the gains, "approaching significance," made by a group of twelve volunteer Centra, Washington State College students enrolled in a reading program were made by six students who had shown the most improvement. These six also achieved greater Embedded Figures Test scores, suggesting to the investigators a relationship between perceptual and reading skills. James (94) found three of five groups of British teacher training college students, who had participated in eight weekly reading sessions with a three-week break in the middle, made significant rate gains but no significant comprehension gains. He concluded that approximately one-third of students in a college population tested would have a low probability of successful study reading of education texts.

Gains in *Nelson-Denny Reading Test* scores were made by 228 students in 12 reading improvement sections involved in Kling's study (107) of values and reading gain relationships (but whether gains were significant was not indicated). On the basis of various comparisons made with several groups, Lowe (115) concluded that a group of 65 college reading improvement program participants had profited from a fifteen-weeks program in which a pre-test, but not a post-test, had been administered. A detailed description of a University of Maryland reading and study skills program for fourteen medical laboratory assistants has been presented by Marani and Maxwell (117). Significant gains in informal listening comprehension test scores and *Nelson-Denny Reading Test* scores were achieved. Netchinsky (131) found that 31 students who had participated in a three-months program at the State University of New York Urban Center in Brooklyn made significant gains in *California Reading Test* scores, evaluated the course favorably, and did substantially more free reading than they had before. Wade (171) reported that sixty-seven percent of Lincoln College students enrolled in a reading course improved their grade-point averages while only fifty-eight percent of those not enrolled did so (but whether the differences were significant was not indicated). Laffey (108) reported that significant gains were made in Speed (*Davis Reading Test*), but not Level or Total scores and in various informal test scores by 50 college-bound disadvantaged Pittsburgh students who participated in a six-weeks reading and study skills program.

In a number of other reports the main concern was the evaluation of a particular method or methods or a comparison of methods. (13; 20; 42; 43; 72; 77; 96; 111; 118; 154; 172; 179) Two more reports of Berger's study of four methods of increasing reading rate (13; 20), in which a paperback scanning method was found to produce most sig-

nificant results over three other methods, have appeared since the study was cited in last year's review (19). In a study involving evaluation of remedial effectiveness of programmed instruction of algebra and English grammar, Goodman (72) found that an experimental group of students who were enrolled in a study-skills-group-counseling-course received higher, while groups containing non-study skills students received lower, than expected grades, leading him to hypothesize that programmed instruction promoted a resistance to learning in students who were most in need of remedial help. While both experimental and control groups made significant test score gains in a University of Southern Mississippi study improvement course reported by Guice (77), the experimental group, which had received additional instructional practice with cloze procedures, did not gain significantly over the control group.

No significant differences were found by Johnson (96) between Nelson-Denny test scores gains of adult groups who had participated in a program in which a reading accelerator had been used in weekly and in home practice sessions and groups which had not used such (although "generally significant gain trends" were reported for both groups). When a volunteer group of students enrolled in basic freshmen courses at the University of Tennessee was compared with a traditional control group of non-volunteers, the results suggested ineffectiveness of tutorial programs in raising grades in a parent course (111); but, when volunteers who persisted were compared to volunteers who attended only once, significant gains over the performance which might have been expected on the basis of ability scores were found. Maxwell and Mueller (118) found that an experimental group of college students who had been given specific practice suggestions for increasing reading rate made significantly greater rate gains than did either a placebo group which had been given material extolling virtues of rapid reading, but not suggested techniques, or a control group. While both experimental and control groups reportedly were involved in Santeusanio's study (154) of a freshmen reading course in which writers of articles in a college newspaper met and discussed articles with the class twice a month, evaluation was carried out only by obtaining 28 student's reactions, 24 of whom "regarded the program as a positive learning experience." In an effort to emphasize the importance of experimental design in preventing wrong conclusions, Wark and Kolb (172) presented a facetious treatment of a real experiment (in which real data were obtained) in which it was anticipated that test experience and forced speed set would produce a post-test gain; but it was found instead that apparently the only effect achieved was to have scores lowered by pre-testing experience.

Craig (42; 43) found no significant differences in reading improvement, dominant interest, or ideal self-concept between a control group

of Hinds Junior College freshmen who had participated in a semester's reading improvement program and an experimental group who had participated additionally in weekly group guidance sessions. Zunker and Brown (179) found that freshmen college students who had received six-and-one-half hours of academic adjustment guidance from upper classmen student counselors showed as much growth in study skills as did a comparable group who had received similar guidance from professional counselors.

Programs with other than college adults were treated in several reports. (2; 15; 75; 85; 106; 160) Anderson (2) found that five of the eleven deaf adults who remained throughout a ten-weeks program made a significant gain of one full year (*Gates Reading Survey*). Significant gains in test scores were made by forty-two adult Negro illiterates who scored 1.9 or below on *Stanford Achievement Tests* (Reading) and who completed 200 hours of adult basic instruction (15). A field test and evaluation of four reading systems used in adult basic education programs with welfare recipients (75) (and involving over 1,800 students, 111 teachers, and 108 classes in three states) did not find any one system to be superior over any other (although all reportedly had some effectiveness), to make any appreciable change in employment or job training qualifications of students, or to show any superiority of certified elementary teachers over non-certificated college and high school graduates in teaching illiterates. Cleveland University adult illiterate groups using *Words In Color* (or morphological-algebraic materials) made significant gains in *California Reading Test* scores while the control group, taught by a "traditional method," showed "consistent loss." The experimental group also improved significantly in auditory discrimination and visual function (fusion) and received higher *Durrell Analysis* oral reading scores than *California Reading Test* scores (85). Stevenson (160) reported that the reading level of the average corpsman at the Atterbury Job Corps Center had been increased one-and-one-third months per month of training. Kling (106), however, using *California Achievement Tests* to evaluate educational achievement of Camp Kilmer Job Corps trainees, after half day academic classes for a three-months period, found no significant changes in reading (or arithmetic or language) scores.

Several additional reports involved programs for listening or other communication skills. Colwell (37) found significant improvement in three of four criterion variables in 24 counselor education students after ten one-hour sessions, over three-and-one-half weeks, of listening skills instruction. In a study of different instruction methods in listening comprehension programs (lecturers with or without practice or tape recordings of lecturers with or without practice), Tabor (165) found no significant gains in listening test scores made by any of the groups; but practice following both lecture and tape recordings pro-

duced significant differences. Henderson (85), in an "admittedly imperfect pilot study," found a group of approximately 200 federal government employees who took a listening program developed by Basic Systems Inc. showed significant improvement in listening scores. Groups which had participated in reading programs only and groups exposed to reading and writing programs also reportedly made listening gains; but the significance of gains, or the testing for significance, was not indicated. Dye and Fiedsoe (52) found heterogeneously grouped Augusta College English composition students to achieve significantly higher final grades than did homogeneously grouped students.

READING, STUDY, AND RELATED HABITS, TRAITS, AND SKILLS

A number of reports had pertinence for the general area of reading and related habits, traits, and skills. (7; 10; 14; 17; 22; 23; 38; 70; 74; 79; 86; 89; 92; 97; 100; 101; 109; 121; 133; 142; 144; 146; 150; 155; 159; 161; 170; 175)

A follow-up study of some of the 440,000 high school students tested in Project Talent in 1960, in which reading achievement measures were included among the fourteen variables involved, revealed a tendency for junior college students to be more like non-college students in ability but somewhat more like college students in socioeconomic factors. Males did better on vocabulary while females did better on reading comprehension. (38) In another follow-up study, Howden (89) found that those who were good readers as children, according to tests given in fifth and sixth grade, were still good readers as adults; and those who were poor readers were still poor, with those who had been average readers falling into a distribution which overlapped poor readers and good readers. Telephone interview information obtained by Preston and Yarrington (142) from 50 individuals who had been diagnosed at the University of Pennsylvania Reading Clinic eight years previously indicated that the educational and vocational progress of these people had corresponded to approximately normal but had come about more slowly and aspirations had been narrowed considerably.

Oliver and Lewis (133) found that art students in British colleges and universities were significantly superior to science students on university entrance tests in English (which included reading comprehension tests), with oral superiority of girls to boys. Richmond (146) found the essay grades of British honor students in arts were significantly better than those of science honor students.

Average reading of entering freshmen at one Michigan community college was reported as between ninth- and tenth-grade levels, with a range from grade seven through grade fourteen. (175) Illika (92) concluded, on the basis of a comparison of samples of teachers studied six years apart, that teachers' knowledge of vowel phonics generaliza-

tions had improved, with teachers understanding the less useful generalizations better than the useful ones.

Questionnaire responses obtained by Galso (70) indicated that South Georgia College students averaged slightly over three hours a day in studying, rather than the anticipated two hours for every hour of class, with females spending more time studying, less time cramming, and feeling in greater proportion than did males that the amount of studying time was inadequate. Vittenson (170) found each of several groups of Negro students in two Illinois colleges feeling, in general, greatly concerned about inadequate study habits and adjusting to college work. The estimates of groups of engineers and scientists with regard to the time spent at various job activities were found by Strauss (161) to tend to be distorted, with the exception of "reading" and "personal" activities. Estimates approached "ideals" except for "reading" and "absent" categories.

Analyses of a sample of twenty-five thousand words collected by Berger (14), from "assorted adult conversational situations," revealed 2,507 different words being used; "I" and "you" the most frequently used words, followed closely by other personal pronouns; a relatively small number of nouns; and simplicity in syllable length and vocabulary usage (the 22 most frequently used words being monosyllables). A comparison by Belcher and Campbell (10) of responses of Negro college students on word association tests with normative data for white students revealed some differences with respect to words from specific test sources and indications that level of reading skill and vocabulary development were related to the quality of association responses. When a free association test with 10 words was given to a remedial English class by Rubenstein (150), the responses to the word, "English", were such as "help", "fear", "trouble", "hate" and "joke" (also prominently such words as "grammar", "spelling", "test", "verbs", "nouns"); but there were few responses such as "reading", "language" and "speech", leading Rubenstein to conclude that class members "might cherish some idea of English as a living medium of communication rather than a bag of labels or remembrance of past disasters" (150:7).

A study involving 1,000 Illinois commercial farmers during the 1967 Arab-Israeli crisis found television the most used medium for obtaining information, with newspapers second, radio third, and magazines least used, and with husbands using newspapers more and radio less than did their wives. Data obtained by telephone interview from Madison, Wisconsin, adults for a study of cosmopolitan media usage and diffusion of international affairs news found a significant relationship between cosmopolitan media usage and knowledge of international affairs, with eighty-seven percent of the sample receiving at least one of the three major news magazines, and thirty-two percent regularly

viewing one of the major television newscasts, Sargent and Stempel (155) found higher (but not significantly) use of newspapers by a general sample, as compared with a group of families on relief, and significantly lower use of radio and television, with poverty, rather than alienation (social isolation), being the critical variable. Analyses of data obtained by Lassahn (109) indicated that economic value was the initial judgement criterion for farmers' preferences for local newspaper items, with county newspaper editors and university information service editors predicting such preferences better than did university extension and county extension specialists. A questionnaire study of University of Wisconsin Medical School faculty, by Shaw and Novei (159), found that sixty percent of the respondents picked up information concerning new research developments within their own special fields from the mass media (especially newspapers and magazines), with only six percent reporting that the information came from books or certain specialized magazines.

Among findings obtained by Brown and Newman (23), from analyses of experience inventory items of high achievers and low achievers in Buffalo area adult basic education classes, were that almost forty percent of non-achievers, but none of the achievers, indicated no school had been available for them to learn to read; poor teaching was not given as cause of reading difficulty by either group; high achievers tended to be on welfare less frequently, were women more frequently, tended to come from less deprived backgrounds, and tended to show preferences for science and more sophisticated titles in reading materials.

Haramati (79) pointed out that from 1957 to 1961 the percent of illiterates in Israel had dropped only very slightly, 13.4 to 12.1 for Jews and 53.0 to 51.7 for Arabs. At the start of an intensive and comprehensive national literacy campaign among adults, 32.0 and 71.0 percent of Arab males and females respectively, and 7.2 percent and 17.1 percent of Jewish males and females, respectively, were classified as illiterate. Khater (101) presented figures which showed a drop in illiteracy percentages in the United Arab Republic from 1.5 to 8.0, for the period from 1907 to 1947; but this drop was not up to expectations held when a literacy act went into effect. Figures cited by Rajguru (144) indicated that after 18 years of independence only twenty-four percent of the population of India was literate (1 out of 4), making for approximately 330,000,000 illiterates in India. While primary education is compulsory, only sixty percent of India children six to eleven years of age were enrolled in school. Kamm (97) defined, in terms of reading scores, the "illiterate adult" in England as one who had an "educational age for reading" of less than 6.5 years and the "semi-literate adult" as one of 6.5 to 9 years. She cited British education pamphlet figures to the effect that in 1961 fewer than 2 percent

of fifteen-year-old pupils had reading scores equal to or less than the average pre-war nine-year-old, while in 1956 and 1948 four percent and six percent, respectively, had such scores.

Questionnaire data obtained by Brattain (22) concerning leisure time pursuits indicated that Manchester College students tended to participate in activities of a "sedentary" nature. Specific activities, particularly reading, were not identified in the summary report of the study. Among findings obtained by Hirsch (86) concerning *Ebony* magazine readers were that readers were 96 percent Negro, predominantly from the Negro middle class, with significantly better education and higher mean income than the general Negro population. A biographical study of Robert Frost by Grade (74), based on approximately 100 chronological annotations regarding Frost's youthful reading, revealed that Frost "apparently had not completed a book independently until he was fourteen" but was then "converted . . . to one with wide ranging interests and concerns."

A telephone questionnaire study carried on with University of Michigan students and a group of non-students found the preponderance of subjects becoming less trustful of news of governmental affairs, with non-college respondents less trusting than the college sample, the highest trust exhibited by supporters of President Johnson, and most extreme ratings given by those who failed to name their preference for president (17). Among conclusions reached in Kenny's study (100), in which tape recordings of college teachers' lectures in New York City area institutions and in various subject matter areas were utilized, were that language using practices were commonplace, conservative, and undistinguished by oral style, and that the "needs of learners as listeners were not sufficiently met by current classroom presentations."

INFLUENCE OF READING, STUDY, AND RELATED HABITS AND SKILLS

Several reported studies have pertinence for the predictive value, or other suggested importance, of reading for college or other academic success. Astor (4) concluded that good reading test scores were better predictors of future college success than were subjective appraisal methods, after only three of twenty Queens College students who had scored low on *Cooperative English Tests* (Reading Comprehension), but judged to have college potential by counselors, survived the first semester (and received C and D grades the second semester). Cortis (40) found that neither vocabulary scores nor any other cognitive variable scores (including another measure of verbal intelligence) correlated significantly with practice teaching grades of British students at the University of Manchester School of Education; but significant correlations were found with final examination grades and with educational theory, basic English, and academic subject grades. Among factors found by Dierman (50) to differentiate significantly between

successful and unsuccessful students enrolled in a University of Utah pre-admission program were high school English grade-point-average and numbers of remedial courses required (but differentiating for males only). In a study of approximately 500 Iowa adults who applied, and were given an opportunity, to take the General Education Development Test (for obtaining a high school equivalency certificate) 75 percent passed (87); the men who passed scored highest in interpretation of reading matter in natural sciences and lowest in correctness and effectiveness of expression, while men who failed also scored lowest in the correctness and effectiveness of expression but highest in reading material in social sciences. Barlow (9) found that students who cheated when using a programmed book appeared to have read the program and had obtained scores above chance level; but they scored significantly below those who actually read and followed instructions. Among recommended objectives and content for college freshmen orientation courses in Louisiana, based upon check list questionnaire data obtained from student personnel professionals, were academic adjustment, using the library, and improving reading and other study skills and techniques. (138)

Several other reports involved studies of persistors and/or dropouts in academic programs. Bennett (7) found lower reading achievement scores for dropouts than for persistors in a Florida adult high school credit program. Elliott (54) found that four-year students in Penn State electrical and mechanical engineering programs were consistently superior on ability test scores (including vocabulary and paragraph reading test scores) to two year students, and graduates to the dropouts; however, the vocabulary and paragraph reading test did not serve to differentiate between graduates and dropouts. Chase (32) found that freshmen students who withdrew from Indiana University during their first semester tended to do more poorly on tests of academic aptitude and achievement (including *Cooperative English Tests* scores) and to anticipate problems with study habits more than did the group of students who had not dropped out. Dropouts who returned to college could not be clearly distinguished from those who did not return. Among non-intellective characteristics indicated for Utah State University graduates or persistors, as compared to dropouts, were better study habits. (137)

Influence on personal and related traits or characteristics was suggested in some reports. Carter (29) obtained indications that the personal and social maladjustments of high school days of 35 adult males who had scored one or more years below grade level on reading tests administered in seventh and eighth grades persisted into adult life. Undergraduate college students who listened to or read the interview between professor and student were found by Maier and Thurber (116) to be significantly better judges of deception attempts on a

course examination than were those who observed the interview. A survey of approximately 60 voters in the 1966 fall election in Los Angeles (119), which included the Brown-Reagan contest for governor and a controversial measure on obscenity, indicated that strength of selective exposure factors (such as interest and party identification) correlated negatively with influence of editorial endorsements seen in newspapers and on T.V., with endorsements appearing to have greatest opportunity to influence last minute deciders. Adult subjects from higher levels of reading skill (university students) were found by Otto and Koenke (136) to have lower consensuality scores and to differ less in their word associations evoked by stimulus reader than did adult groups of lower reading levels (basic education class and vocational typing class students). Results obtained in another study (26) indicated that processing of numbers presented tachistoscopically was more flexible than that of letters (relative to direction recall) but that processing of letters was in part influenced by a subject's reading experience (with regard to directional sense).

Among the eight trends noted and described by Nelson-Jones (130), on the basis of his study of a sample of 24 colleges and universities, chosen for their "leadership in the general education movement," was one of greater emphasis on English composition and comprehension, with stress on reading and writing skills being mentioned particularly in connection with several institutions. Calder (27) found no significant differences on performance tests among five self-instruction methods for learning motion picture projection operation, one method of which involved reading written instructions and illustrations. Watson (173) found no significant differences on either post-test or retention test scores of groups of supervisors participating in a seminar on employee appraisal, whether a group's method involved any one of various seminar discussion methods or only having each student read in a programmed instruction booklet.

Among conclusions made by Bradley (21), on the basis of his study of factors affecting success of Negro undergraduates in seven Tennessee state schools, were that institutions involved did not provide enough remedial non-credit course work for students to overcome their language arts deficiencies and that English and mathematics entrance test scores could not be used in the usual way for predicting academic success of the Negro students. The surprisingly low degree of "concordance" found by Deno (49) in his comparison of responses elicited by words and by pictures representing words suggested to him that a picture does not represent the same concept as a word. Higher criterion test scores were obtained by subjects in Gulo and Nigro's study (78) who only read material in conventional textbook format than by subjects in either a programmed or television instruction group.

FACTORS INFLUENCING READING AND OTHER STUDY HABITS AND SKILLS

A number of reports dealt, in general, with relationships between personality traits or characteristics and reading and related skills. (25; 55; 56; 81; 107; 126; 127; 128; 174; 176) Marquette University freshmen in Brunkan and Shen's study (25) who were high-rate and efficient readers judged themselves as possessing personality characteristics highly favorable to good college adjustment and achievement; low-rate and ineffective readers rated themselves as possessing opposite personality traits. The only significant correlations obtained in Kling's study (107) of relationships between reading gains made by reading improvement sections and values were those between the rate gain scores and Theoretical and Aesthetic values, for both the men and the total sample, and, for the women, between rate gains and Theoretical values and between comprehension score gains and Economic and Political values.

Neal has presented three reports of her studies with University of Illinois freshmen. (126; 127; 128) She found various types and degrees of reading-personality relationships, with indications that poorer readers are more likely to have neurotic tendencies than are the better readers, even in highly able groups, and for "quiet, thoughtful, feminine, agreeable" women and "quiet, thoughtful, cultural" men to be better readers. White, Kingston, and Weaver, in two reports of their studies (174; 176), indicated finding that the relatively high "anxious" reader (among undergraduate educational psychology students) tended to project affective characteristics of himself into ratings of a protagonist in a reading selection, while low "anxiety" students did not appear to relate to such a character's behavior patterns. Finding no single system of relationship between measures of reading comprehension yielded by cloze procedures and Affect measures for female students, they concluded that the Affect factor in cognition is more specific than seems to be assumed.

Harless (81) obtained evidence, with Wisconsin State University freshmen, that the extent of involvement of readers with story content of adventure and mystery novels is a function, in part, of their self-concepts and predispositions and that attitudes not directly aroused by a story may be changed. Estabrook and Summer (56) concluded, on the basis of relationships indicated between study habits and introversion-extroversion traits of a group of university students, that a degree of flexibility in planning study places for students was called for. Elton and Rose (55), studying personality characteristics of samples of male writers of letters to the editor of the University of Kentucky campus newspaper, found that letter writers appeared to be "brighter and more democratic" than a sample of non-writers, with a Suppression-Repression factor emerging as the second most significant differentiating variable.

A group of other reports was related to influence indicated or suggested for various personal traits or characteristics. (15; 33; 39; 46; 93; 132; 145; 151; 153; 162) Ingram's study of University of Arizona freshmen's self-analyses concerning their reading processes while reading an essay indicated that superior readers have greater awareness of their reading processes, have greater interest in improving reading, use flexible rate more frequently, relate their reading to personal growth more, and tend to use the visual (rather than the auditory) mode more often than do low-level readers. Reese (145) found achievement motivation of a group of California adults to be positively related to preferences for delayed gratification magazine content but not to television preferences, in general. Sanders' Q-methodology analysis (158) indicated that adults read sports news because of some identification (participating or non-participating) with the subject matter, with attraction to certain sports being attributed to a variety of reasons. Sales and Haber (151) reported finding clarity of letters seen in words presented tachistoscopically to groups of University of Rochester males decreased from "frequent neutral" to "rare neutral" for "taboo" types of words, which they interpreted as support of a "perceptual defense effect." Stuart's findings (162) led him to link retardation and particular perceptual skills to particular reading difficulties.

Cooper and Stieglitz (39) obtained indications of improvement in average English proficiency of foreign students at Columbia University in 1963 over the performance of such students in 1951; but they noted differences among students from varying backgrounds, which they attributed, among other factors, to structural differences between the native and English language; importance of English in the social, cultural, and political life of students' native countries; and chance variations in native ability of students. Davies (46) also noted the effect of the home or native language upon English proficiency of overseas students studying in a British college. He also observed that varying academic levels, relative to types of schools and colleges, did not require varying English proficiency and that students requiring most remedial attention were Semitic, Mediterranean, West Africa, and East and Central African.

Berke (15) found that all the adult Negro illiterates in his study had ineffective visual and auditory discrimination skills and that listening comprehension level was not a good indication of reading potential for these subjects. Among reasons found by Nicholson and Otto (132) for adult basic education program dropouts were job shifts or changes and needs for transportation and child care facilities.

Christ (33) reported finding the majority of Loyola University (Los Angeles) students surveyed preferring or practicing studying alone and in their rooms. They also felt that lack of quiet and adequate lighting were the greatest deterrents to studying.

Another group of reports dealt, in general, with influences on retention, recall or other types of understanding of material read. (44; 48; 66; 61; 88; 102; 103; 104; 123; 140; 152; 166; 167) Older subjects (60-79 years) seemed to be at a greater disadvantage than younger subjects (20-39 years) in recall of meaningful (as contrasted to meaningless) material and also more vulnerable to effects on recall of supraspan interference in Craik and Masani's study (44). Dawes (48) found that both immediate and delayed memory of set relations asserted in meaningful selections was significantly accurate for his British subjects and that simplification, or errors in recognition, was also significant but decreased, rather than increased, over time. King (102) reported finding retroaction effects of, and varying as a function of levels of, "contextual restraint" upon accuracy of recall of passages. In another article, King (103) reported finding accuracy of retention of prose passages by college students to be influenced by neither oral nor written modes of presentation nor sex of subjects; but written recall was found superior to oral recall methods for retention of sequences in both prose and poetry material. In another report, King and Madill (104) indicated finding that recall of subjects who read three different lengths of material was better when material was presented visually while being read orally, or was presented visually for the length of time which would have been required for oral presentation, than when presented only orally.

Learning rate and extent of recall of University of Capetown students in Mills' study (123) decreased as familiarity with normal English sentences fell but increased as familiarity with abnormal English passages decreased. In an experiment carried on with British housewives, Poulton and Brown (140) found that reading aloud of a passage had a detrimental effect upon recall of the first part of a paragraph but that most of the rest of the passage was recalled equally well after either oral or silent reading, with reading aloud showing an actual advantage for recall on the very last part. In a study involving immediate recall of college students after reading a passage, and delayed recall 24 hours later, Thalberg (166) found that slow readers retained significantly more than average and fast readers immediately after reading; but under delayed testing conditions the differences were found to have disappeared, suggesting that reading programs with stress on rate and comprehension will not affect comprehension unfavorably. Treisman (167) found that the repeating back of passages in native and foreign languages was affected by the subject's familiarity with the language; that as the information content of passages increased, efficiency decreased in both repeating back and translating; and that translating was more difficult than repeating back, and increasingly so as information content increased.

Subjects (elementary students and college juniors) in Samuels' study (150) read paragraphs with high associative words faster and with better recall than paragraphs with low associative relationships. Fodor and Garrett (60), in a study involving presentation of three lists of sentences differing in perceptual complexity to paid MIT undergraduates, found presence of pronouns facilitating accuracy of, and time required for, paraphrasing while presence of adjectives had no effect. In another report (61), they indicated that verb complexity affected a subject's performance. In a study reported by Horowitz (88), in which three sets of materials with varying combinations of lexical, syntactic, and ideological simplicity and complexity were used, listening, in general, seemed to be a looser and less inhibited modality, more likely to distort material conveyed, a more direct and less complicated process freer from the stimulus, and more commensurate with naturally-occurring thought processes.

A noticeable number of reported studies has been prompted by Rothkopf's "mathemagenic hypothesis," which refers, in part, to a variety of ongoing responses within a reader as he reads printed material and acquires and retains information. (24; 63; 64; 65; 66; 143; 147; 148; 149; 152) Findings of various studies have indicated, in part and in general, that retention of both specific and incidental information in prose passages is facilitated by inclusion of short tests or test questions with the prose passages, with questions after, rather than before, sections of passages tending to produce optimum retention for both general and specific information; with retention increasing with frequency of post-paragraph questions, but decreasing with frequency of pre-questions; with relevant material being retained better than incidental; with retention lowest with general questions; and with repeated exposures to material resulting in modification of inspection, or "mathemagenic", behavior. Pyper's study (143), one of the most recent ones reported, yielded results which did not agree with prior research findings, most of which have been reported by Rothkopf (147; 148; 149) and by Frase (63; 64; 65; 66). Pyper reported his results as "tenuous" and felt that other "uncontrolled variables" had operated.

Another group of reports had pertinence for the general areas of persuasion, convincing, and/or susceptibility. (12; 45; 76; 122; 158; 177) Culbertson (45) did not find "iconicity", the degree of resemblance between symbol and referent (ranging from photographic photographs to bar graphs to words alone) affecting the comprehension ability, attitude intensity, or beliefs of Southern Michigan farm people regarding how "pro" or "con" articles dealing with controversial topics were. Gruner (76) reported that editorial satire (as reflected by two columns written by Art Buchwald, one relative to labor union practices and the other to a policy of non-recognition toward Red

China) produced small, but significant, attitude changes among a group of University of Nebraska students. Canadian students in Miller and Rowe's study (122) were influenced more in their evaluations of other individuals as possible roommates when "unfavorable" adjectives were included in information presented them by favorable evidence. Schulman (158) found that Indiana University students holding a popular view (leniency) initially on the issue of lenient or harsh treatment of juvenile delinquents showed a greater mean change in attitude after reading a counter communication than did those who held the unpopular view (harshness) initially. Persuasibility scores of second-year college students in the United States and five foreign areas were found, by Whittaker and Meade (177), to be higher in all cultural areas for females (except those from Lebanon), but significantly different only in the case of Hong Kong, with older subjects tending to be less persuasible than younger and sex differences most consistent in adolescent cultures. Results obtained in a study of "quality" and "effectiveness" of actual brassiere-girdle advertisements from magazines and newspapers, when exposed to sixty first-year nursing school students, supported the hypothesis that forced exposure to, and repetition of, advertising lowers the threshold for perceiving the advertisements. (12)

A final group of reports dealt with miscellaneous, but pertinent, areas. (3; 6; 31; 80; 90; 95; 124; 129; 134) Asso and Wyke (3) found that when experienced female English readers were presented with words that could be read meaningfully from either right to left or left to right, they read in a right-to-left direction even when words contained other reversals; frequency of words and positions of reversed letters seemed to have little effect. Chakrabarti and Barker (31) found no significant tendencies for 41 left-handed Texas A and M freshmen, compared to 311 right-handed male freshmen, to be inferior in reading achievement. Harcum (80), in an extension and/or duplication of earlier preliminary studies of effects upon relative accuracy in visual hemifields, found results which indicated influence of redundancy upon accuracy and upon mnemonic encoding imposed by subjects upon patterns.

Ayars (6) cited figures from a study referred to in a speech given earlier which indicated that, when top executives deliver a message orally, the message is received by 80 percent of the vice presidents, 50 percent of plant managers, 40 percent of operating supervisors, and 20 percent of the men on the line. Jester and Travers (95) found no significant differences in scores on *Davis Reading Test* items among a group of University of Utah educational psychology students who had listened to time-compressed tape recordings of test passages read at varying rates, a group which had listened to recordings in reverse or decreasing order of rates, and a group which had listened to recordings

at a constant rate; but there were indications that time of exposure to passages might be an influencing factor. Orr and Friedman (134) found that listening aids (reading precis of a passage or examining a list of 130 key words from a passage) did not yield greater comprehension of time-compressed speech, as compared to that of a control group; but practice did seem to result in improvement to a point where differences became statistically non-significant from mean performance at a relatively standard rate.

Neisser and Beller (129) reported that when Harvard and Brandeis University subjects scanned a word list for meaning they were much slower than when they scanned for specific words, supporting the hypothesis that searching conditions requiring memory examination have slowest scanning rates. Study results obtained by Hvistendahl (90) indicated that none of the four conditions of paragraph heads had significant reinforcing effect on recall of textual material on the part of 435 readers in the sample. A group of 152 University of New Mexico undergraduates, who had participated for 6 weeks in a lecture course in educational psychology in which the instructor provided the cue when he wanted them to take notes, were reported by Moore (124) to have scored significantly higher on a course examination over the lectures than did the control group who had not been cued. The experimental group also rated the instructor more favorably, while the control group indicated the instructor had more annoying mannerisms and personal characteristics.

TESTING, READABILITY, NEWSPAPERS, MATERIALS, AND OTHER AREAS

The remainder of the reports or articles found relevant for purposes of this year's review fall under the four general and one miscellaneous headings indicated above: testing (34; 47; 59; 62; 73; 82; 110), readability (8; 36; 57; 58; 67; 68; 99; 105; 112; 113; 120; 141), newspapers (16; 28; 30; 53; 125; 139; 178), materials (5; 41; 168), and other areas (90; 98; 164; 169).

Davis (47) has presented a detailed report of intensive differential item and uniqueness analyses on test items constructed for eight reading comprehension skills. The tests in his study were given to what he called "mature readers" (twelfth graders, not college students). Results indicated that reading comprehension is not a unitary trait, with the skills showing up appreciably being memory for word meanings, reasoning in reading, following passage structures, recognizing writer's purpose and mood, and finding answers to explicitly stated or paraphrased questions. Coates (34), in an extensive series of analyses reported at this conference last year, used various paired combinations of Forms A, B, C, and D of the *Diagnostic Reading Test* (Survey Section) and pre- and post-test scores obtained over a two-year period in the guidance and reading programs of St. Petersburg Junior College. He concluded that the range of correlations obtained between various

pairs of forms was "too great for tests that supposedly give equivalent values" and that some weighted factor needed to be added in scoring when the forms are used in reading improvement programs. Farr (59) discussed a technique, also at last year's conference, for studying construct validity of sub-tests of specific reading skills and presented results of application of this technique to the *Nelson-Denny Reading Test*, *California Reading Test*, and *Gates Reading Survey*.

Fogg and Calia (62) administered positive forms of multiple choice science course examinations (choosing one "best" answer from five responses), to some groups of Boston University freshmen, and negative forms (marking incorrect answers only among the five responses); they found no significant differences in achievement on final examinations between positive and negative techniques groups nor in critical thinking skill scores. Gover (73) has reported development of a test intended for measuring ability to organize ideas and that "substantial normative data" have been collected for college students and "more limited" data for adults. When both multiple-choice and open-ended forms of a vocabulary test were given to 100 British sailors by Heim and Watts (82), significantly higher scores were obtained with multiple-choice forms; a significant positive effect was exerted on second test scores, and a much higher association between intelligence test and vocabulary test scores resulted, when multiple-choice forms were given first. In an attempt to find evidence for validity of an Affective Taxonomy model, Lewy (110) constructed tests at various taxonomic levels in mathematics, music, and reading and administered these to over 200 high school and college students. To determine concurrent validity of the tests constructed, the number of books of literary value read by examinees during a one-month period before taking the tests was used as a criterion for reading. Lewy concluded that data he obtained provided evidence of validity of his model.

A number of reports reflect the continued, and somewhat increasing, attention given to readability techniques and procedures. Barker and Stokes (8) developed a simplification of the revised Lorge Readability Formula by substituting "number of big words" (words of six or more letters) in the regression equation for the more complex variable of proportional words not appearing on the Dale list. Fry (68) presented his "fast and simple" readability formula, which involves counting the number of sentences and the number of syllables in hundred word samples, at this Conference last year (68) and also in a later report (67). He reported correlations of .93 to .98 with estimates obtained with SRA, Dale-Chall, Flesch, and student comprehension procedures. Fang (58) described his use of a computer for calculating average sentence length and number of syllables for obtaining Flesch Reading Ease scores of newspaper and television newscasts, with reportedly "an average error of one-half of one percent, or less." Fang

also presented a "listenability" formula (57) which involves simply counting each syllable above one per word, in any sentence, and getting the average for sentences in the selection. He obtained correlations of .96 between listenability scores and Flesch Reading Ease scores, for both 36 television scripts of newscasts and 36 newspaper samples. Lynch and his coworkers (112; 113) have reported some results of analyses to determine dimensions of human interest judgement with regard to the news, with the four dimensions emerging being "personalism," "evaluation," "complexity," and "constraint." The judgmental measure of human interest which they developed, a "human quotient index" (HQDEX), involved four variables or indices: syllables per one-hundred words (passage complexity), variants in modification per sentence (emotiveness), type-token ratio (lexical diversity), and Flesch Human Interest score (personalism).

McLeod (120) presented prose passages in which words were systematically deleted to groups of elementary children and university undergraduate students, thereby obtaining data which indicated that the "estimated redundancies" obtained seemed to have significant possibilities for readability assessment. Coleman and Miller (36) have presented and explained a new readability measure which measures information gained or the efficiency of transmission of new information. A method based on cloze techniques which permitted use of "bilateral constraint" proved unfeasible, while a method permitting only "unilateral constraint" proved feasible.

A simplified Flesch version of a communication concerning fire rules produced significantly better comprehension on the part of personnel of a large state hospital than did the original, traditionally-worded version. (99) Kantzer (105), finding Flesch Readability scores of 61 junior college faculty handbooks, from California and Arizona, to receive ratings of "difficult" or "very difficult", considered the handbooks to be "consistent with the general educational levels of junior college instructors." A readership survey made by the editor of the *Wisconsin State Journal* indicated that interests of readers in the subject of news items was a greater factor in determining readership than was either readability (Flesch) or prominence of display of news items. (141)

Checking on the accuracy of local items in three San Francisco area newspapers, Berry (16) found a little over half of all stories entirely accurate, when spelling and typographical errors were excluded. Omissions, misquoting, inaccurate headlines, and over-emphasis or under-emphasis were the most frequent types of errors. Telephone interviews, the most frequently used sources of information, produced only about two-thirds as many accurate stories as did personal interviews. In an experimental study of methods of gathering newspaper readership data (28), in which University of Minnesota students and student

wives were used, most noticeable differences were found to occur on items which had not been read in depth. In an interview survey conducted by the National Opinion Research Center, and reported by Chaffee (30), only the newspaper was rated by a number of respondents as "helpful" or "very helpful" in informing them of local school affairs; television was indicated most often as "not helpful at all."

As a result of a study of five examples in the *New York Times* of faulty and misleading treatment of stories based on polls and opinion research, Wiebe (178) made a plea for understanding and consideration, on the part of editors, of technological aspects (such as representative sampling and applicability of findings) of public opinion research along with (and in deference to) the "familiar but inappropriate skills of traditional journalism." Poulton (139) found that headlines printed in lower case (with first letters capitalized) were located significantly faster by British adults searching for information than were the same headlines in capitals. Moynette and Rarick (125) analyzed front page news stories and editorials from two newspapers from each of five Pacific Coast metropolitan areas and found editorials to be more readable than news stories, with leads (first hundred words) less readable than the last hundred words in both news stories and editorials. An extensive review of the daily newspaper situation in India by Eapen (53) indicated that, while there has been considerable growth in the number of newspapers and in circulation from 1954 to 1966, the better papers are in English and, although judged to be high in quality, appear to meet the needs of a small group of highly intelligent and literate group rather than those of the masses.

Atwater (5) found that in the eight college-level workbooks or practice materials (of the eleven examined) which explicitly defined comprehension, none defined comprehension as mainly recall of factual information; however, approximately three-fourths of the questions or tests over material presented called for factual recall. Utsey (168), in his survey of fifty-two commercial workbooks or other materials intended to aid vocabulary development in college reading courses, found almost all to be "rather traditional" in approach and directed, in general, to seven different types of areas of practice or study. Cortright (11) found that comprehension test results obtained with materials used with adult illiterates in two eastern cities did not differ significantly among any of the three styles of writing used with the materials; expository, conversational, or interrogative. He obtained indications that expository style tended to yield higher scores and to be preferred by teachers and that conversational style tended to be least understood.

Uttal and Smith (169) considered results obtained in their experiment with regard to recognition of alphabetic characters during voluntary eye movements as cause for doubt that "generalized blanking,

or "saccadic suppression", occurs during eye movements and as evidence for the possibility that under some conditions recognition of patterns during eye movements may be rather good (contrary to the usual and long-held belief). The ratings of library services obtained by Hutcherson (90) from slightly fewer than 500 library administrators revealed that a definite majority view various library services for adults as desirable and feel the public library should play a role in occupational training of adults; but few programs have been carried on and few plans are being made in this regard. Katz (98), in a report headed "Statistical Wailing Wall," has presented information concerning a national survey of poetry in public libraries.

Taber (164) interpreted the finding that values of products appearing in illustrative editorial content of *Playboy* and *Esquire* were higher than the values of those on advertising pages as indication that both magazines were attempting to increase "quality of readership". (He found no differences in values of products pictured on editorial pages and those treated on advertising pages of *True* and *Stag*.) He also concluded that income of *Esquire* readers was higher, in general, than that of *Playboy* readers, since value of products advertised in the former was greater than in the latter.

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Linguistic Assumptions and Reading Instruction

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I want to comment on a few linguistic assumptions of my own choosing, assumptions which seem to me to be accepted dogma by some linguists and by many reading specialists. The term "linguists" as used here does not really exist as one sociological or intellectual entity; I am really using the term for the "Zeitgeist"—the "linguistic atmosphere" pervading the reading field brought about by the belated discovery that there is a philosophy and science dealing with language and that these philosophers and scientists of language seem to have something to say about reading.

Following are the assumptions which to some degree most linguists accept and which often appear in communications to reading specialists as natural law:

- (1) Speech is the only possible primary language coding modality.
- (2) Reading is nothing but interpreting written speech.
- (3) There is no difference in producing language and in interpreting it.
- (4) Language is a system organized apart from its referential function.
- (5) There are no such linguistic units as "words."

LANGUAGE AS SPEECH ALONE

If there is one thing about which all linguists are agreed it is that speech is primary among potential language modalities. To most linguists, language is speech and there is little more to be said—except about speech. On the other hand, people learn to read a foreign language without speaking it; the deaf and dumb learn language; and there are even cases of the deaf and dumb and blind learning language. There are several arguments presented to explain these performances, but the point is that while it would be foolish to argue against the primacy of speech as language has been performed by man (historically), it is little less than speculation to argue that language is impossible, for individual or community, without speech. This is not an academic question for the reading specialist for at least two reasons. First, the emphasis of linguists on the primacy of speech has led to a condescending treatment of other language modalities, if other modalities are even mentioned. Recently, when linguists have been giving some attention to reading, the most common view is that reading involves a one-to-one transduction of graphic signs to verbal signs. This transduction is commonly considered to operate at the per-

ceptual level with the underlying cognitive organization only entered with the verbal sign. The process, then, is from graphic sign to verbal sign to cognitive interpretation, and the contemporary linguistic thinker seems to view this sequence as immutable. This is in spite of the fact that oral productive language operations interfere with interpretive cognitive operations (Weaver & Holmes, 6). From this, it would seem that if verbal signs give entry to cognitive process while graphic signs do not, oral production of the signs should lead to greater comprehension. The other possibility is that oral production of verbal signs interferes with an internal processing of verbal signs within the organism. This assumes that oral production of verbal signs and "inner speech" production of verbal signs are in some way different processes. If they are different processes then speech is something different from inner speech and the primacy of speech for language again has competition.

Second, a common injunction to the reading specialist is to use the oral language of the child as an instructional basis for teaching reading. Since this injunction has been followed in the past in only the loosest way and many individuals have, nevertheless, learned to read, the doubt arises that such a technique is a necessary component of instruction. The efficacy of such techniques, then, needs testing in order to determine the contribution to instruction. Speculation should not be accepted as established principles for instructional use.

THE LINGUISTIC IDENTITY OF PRODUCTION AND INTERPRETATION

Another assumption made by a number of linguists is that the processes of speech production are the same as the processes of speech interpretation. I take it, that by analogy, writing processes are the same as reading processes, though there is little commentary on this. Perhaps because it is not heard as much, the latter statement sounds more ridiculous than the former. This is probably an artifact; however, the statements are equally ridiculous. Linguists argue that the linguistics are the same but this sameness is concealed by the propensity of investigators to examine performance rather than competence. Performance includes many non-linguistic variables which account for the lack of observable congruencies. When one looks at competence, the argument goes, differences even among different languages vanish and certainly production-interpretation differences do so. The problem with this argument is that one comes to know competence only through performance. Some extra-empirical technique must then be applied in order to decide which elements of performance represent the immutability of competence and which are transient effects of individual psychology.

The psychologist finds great differences between language production and interpretation. Encoding involves a heavier information load for the organism. Speaking has a difficulty gradient which appears as

pauses in speech (Goldman-Eisler, 3). Listening, one can afford no such hesitation. An individual reacting aloud a difficult passage has no difficulties with the phonological contours of speech production, that is to say, he does not exhibit the hesitation behavior of extemporaneous speech production. Encoding involves recall-like operations: decoding mainly employs recognition. For an accomplished reader the cognitive load, in Bruner's (1) sense of the term, is light. Encoding involves a one-to-one relation between the source and the message; decoding involves a many-to-one relation between the message and the destination.

Interaction of Productive and Interpretive Information-flow and Modalities

There are differences between speech and writing and between listening and reading. Few would claim that these processes are independent, but the psychologist should not accept pronouncements of linguists that observed differences are not language differences *because* they are psychological. There is no such thing as language without human psychological organization.

Most differences between listening and reading which are fairly open to observation involve storage and retrieval differences. A reading display is available over time; a listening sequence is only available for intervals not controlled by the subject. A reading display allows a focused search of static materials; the listener must store all he searches. A reading display allows the reader to postpone or "put out of mind" irrelevant parts of the display; the listener must decide on irrelevancy immediately or risk interference of one part of the sequence with another. Differences in speech and writing are, in part, an effect of the same processes. Speaking in conversational situations allows a convergence procedure for decoding since the listener can ask for repeats and clarifications. The listener, nevertheless, must put together the message segment by segment and depend upon internal retrieval processes to scan any portions of a message which is to be compared with other parts of the message. Furthermore, if the listener is doing his editing which the speaker is producing, a heavier load is placed upon the memory of the speaker, for he has not only to produce elements of his own verbal organization, but he must remember how he has modified previously for the benefit of the listener. The writer has no such problem. He can consider the entire display of the message as many times as he wishes to repeat his perusal. The reader also can search at his leisure for the organization of the writer without great strain to his memory and retrieval processes. It is not trivial, then, for an understanding of language that these information handling processes are different. As the Chinese proverb puts it, "The palest ink is clearer than the best memory" (Webb, *et al.*, 7). Through the discussion here is concerned with psychological process direct relation-

ship to linguistics can be demonstrated. For example, the fact that writing tends to be more formal than speech may be expressed as syntactical and lexical differences in the choice of language units in speech and writing which in turn may be ascribed to differing organismic requirements for information processing under the different conditions.

LANGUAGE AND REFERENCE

The syntactic component of a linguistic description is a set of rules that generates an infinite class of abstract formal structures, each of which describes the syntactic organization of a sentence. It is the source of the inputs to both the phonological and semantic components. The phonological component operates on such formal objects to determine their phonetic shape, while the semantic component operates on them to determine their meaning. Both the phonological and semantic components are, therefore, purely interpretive: they relate the abstract formal structures underlying sentences to a scheme for pronunciation, on the one hand, and to a representation of conceptualization on the other. (Katz, 4, p. 111)

The implication of this statement is that language is not organized from experiences of the organism with the "real" world, language (and primarily the syntactic domain) organizes the real world. This is not the place to argue the philosophical merits of such a statement, but it is of great interest to reading specialists that learning from reading, assuming this statement to be true, is no longer interpretable in terms of the psychological learning formulations of the past seventy-five years or so. Since most reading specialists have not paid a great deal of attention to this tradition anyway, perhaps this will not be a loss of great impact. However, there are a number of characteristics of this point-of-view that place discourse at this level far away from propositions which might be helpful to the reading teacher. This statement is made, not of a particular language, but of all languages. According to this view, language is a species specific characteristic of man and in its elements (as defined by the linguists) it is universal. Notice, input is to phonological and semantic components; therefore, speech is necessary (in a strict sense) language dimension; other coding modalities are only secondarily possible. The semantic component of this system is not meaningful in its own right; it interprets a separate "representation of conceptualization." That is, non-linguistic entities are in a separate functional system which is not analyzed because it is not linguistic. In effect, from this point linguistic investigation may proceed apart from the confounding effects of what the language refers to.

There is little firm evidence one way or another for or against this particular formulation; certainly, there are alternative formulations that have as much persuasive power. The difficulty with this statement for a psychologist is that the theory is not stated in testable terms. The theory will probably never be so stated, for contemporary linguists who have formulated the theory have abrogated empirical tests as the court of final appeal.

WORDS AND THE LINGUISTS

Even before contemporary theoretical formulations linguists have abhorred words as language units. Analytically, the word is obviously not an elementary unit, but then neither are morphemes or phonemes, have been able to define them in precise ways, although the precision is less than perfect. There are a number of objections to the word as a basic unit, but this is true of more linguistically acceptable units also. Chomsky (2) is now finding many objections to the phoneme as a unit. Among teachers and psychologists words have proven to be useful entities. All beginning reading programs end up with certain word criteria for instructional effectiveness, and many programs begin with words as units. There may be a better way, but it remains to be shown. Wherever children learn to read all of the difficulties of those who do not learn cannot be attributed to the method. Generative analyses of the constituents of sentences typically end with words. There is better evidence for the word as a psychological unit than any other unit the linguists have proposed. I take it that much of the vehemence of the linguists who are in contact with reading instruction against the word as a unit is a reaction to the mistaken assumption of teachers and researchers that the word is the only unit of language, and to the mistaken notion that if words are learned nothing else is necessary for accomplished language behavior. If the reading specialist asks what is to be substituted in an instructional procedure that does not use the word as a unit of language the linguist has little to offer. Individuals knowledgeable in linguistics and concerned with reading instruction who offer help to reading teachers do not ignore words as language components but, rather, seek to place the word in proper perspective for the teacher.

The linguist, generally, begins with the assumption that language may be analyzed separately from "meaning," and he rejects the concept of the word as unit. He, thus, is able to develop an elegant, that is, internally consistent, model of language. Nevertheless, there is much more "pragmatic" evidence that the approach of the reading teacher leads to improvement in language and conceptualization in students. There are few applications of linguistic findings to the teaching of language to a native speaker or writer, and even fewer to the teaching of listening and reading. (Weaver, 5)

CONCLUSION

The present impact of linguistics upon instruction is very much like the impact of psychological research in the 40's and 50's. We do not quite understand what's going on, but it sounds good. Under these conditions the most dramatic ideas tend to be the ones which are introduced and which, though often grossly misunderstood, gain favor. The problem is that poor scholarship interpreting ideas from basic studies magnifies the effects of that poor scholarship. Teachers become confused and frustrated and suspicious of the value of all scholarship. Instruction can only be informed in part by basic studies.

The ratio of what we do not know to what we do know is so great that instruction must proceed on its day-to-day course largely by traditional and expedient methodologies. Philosophical systems whether psychological or linguistic cannot function as instructional models because they are filled with error and the greater the detail (with which instruction is concerned) forced from the system the more the error. Linguists have some things to tell the reading instructor which he can use and some other things to tell him which he can't use but which are relevant to his understanding of his task; but the linguist communicates chiefly with his own kind and this communication, given the present state of the discourse, the reading instructor, in his role of instructor, would do better to ignore.

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Areas of Confusion in the Development Of a Science of Reading

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The challenge of reading as an area of inquiry lies not only in its importance in our culture, but to its stubborn refusal to reveal its dimensions to the blandishments, logic, and investigations of students in the field. Hundreds of published works testify to the complexity of the reading process and to the fact that reading behavior correlates with numerous characteristics of the human organism. However, despite the volume of reports and the efforts of many, the nature of the reading process remains comparatively unknown. Although a few reading specialists have theorized about the nature of the reading process, comparatively few scientific theories have emerged (1). Indeed, many reading specialists apparently feel that either reading can never be explicated or that efforts in that direction should be the concern of persons other than themselves. It seems unlikely, however, that we can understand, control, and predict reading behavior unless scientific procedures are utilized.

WHAT CAN SCIENCE OFFER?

A number of problems must be dealt with if we are to employ scientific methods to explicate the reading process. First, it must be decided which science and what methods are likely to prove valuable in speculating about reading. Psychologists, physiologists, and linguists seem to have been interested in the challenge of reading. But none of these sciences appears to be sufficiently isomorphic to serve as a model for a science of reading. Secondly, it is necessary to determine which aspects of reading are vulnerable to scientific inquiry. At present the field of reading seems to be a *potpourri* of poorly delineated behaviors and undefined terms. Because many aspects of reading behavior are covert they are not readily appraised (5). In fact, many scientists are reluctant to even grapple with covert functions either theoretically or experimentally.

Despite the difficulties involved, it still seems likely that the reading process can be subjected to scientific inquiry, and the results helpful. It should be pointed out, however, that we are less certain about the categories, contents, and methodology of scientific inquiry than we once were. We no longer speak of the scientific method with the assurance of those in past generations. Nor are we so certain about what can and cannot be subject to inquiry. Yet it seems reasonable that

many dimensions of reading can be immediately subjected to scientific inquiry.

One dimension of science that is immediately applicable to reading, it seems to me, is what might be called the scientific posture or attitude. Regardless of his discipline or mode of inquiry, the scientist manifests curiosity and skepticism. The scientist is inquisitive and continuously raises questions about his field of interest. He also is skeptical about the validity of pronouncements by authority figures, is dubious about avowals of faith and statements of personal beliefs, eschews accepting as factual casual observations, and questions the acceptance of present and past customs without subjecting them to objective testing.

Another dimension of science that also is immediately applicable is the systematic mode of inquiry employed. Scientists seek to group or classify the phenomenon being studied into classes or categories based upon certain common or non-common structures or processes. They also assume that phenomena exhibit characteristics that tend to be orderly and more or less permanent. Or that if they change, they change in an orderly manner and with a frequency which can be predicted. Finally, scientists assume that events or occurrences are caused and that certain specific and essential conditions precede any given event or occurrence. Finally, most scientists seek not mere understanding, but the prediction and control of the phenomenon studied.

Reading scholars have tended to be both electric and catholic in what has been borrowed from other disciplines. Only a handful have tried to build systematic theories. And few of these have been systematically and extensively tested either by the proponents of the theory or by their colleagues in the field. Someone less kind might be tempted to add that a casual examination of the works of some reading researchers might lead to the conclusion that the research was undertaken for such reasons as the availability of subjects and instruments rather than to test hypotheses generated by induction.

WHICH SCIENCE? — WHICH STRATEGIES?

A number of disciplines continue to intrigue those interested in explicating the reading process. They seem to be either logically or empirically related to the questions raised by reading specialists. Psychology, of course, with its efforts to study human behavior along a broad continuum probably offers the greatest promise. In a previous paper, the writer discussed at length certain areas where the work of psychologists may have bearing on that of the reading specialist (2). Psychology as a comparatively new science, however, has many problems of scope, methodology, and instrumentation. Because of space limitations it is not possible to adequately discuss the numerous and varied dimensions of present-day psychological inquiry. The reading

researcher who seeks answers in this field, however, must spend considerable time deciding which psychology offers the best approach to studying reading behavior. Only a few of the problems which must be faced can be suggested. Should the investigator of reading approach his investigations in a holistic or molar manner, e.g., examining the responses of the organism as a whole? Or would it be more profitable to utilize a more elementistic or mechanistic approach, i.e., studying small fragments of reading behavior? How willing is the investigator to deal with the "black box" i.e., such covert behaviors as cognition and thought?

Perhaps learning theory provides a model for examining reading. Such established constructs as the basic of learning, reinforcement, discrimination, generalization, practice, transfer, forgetting, and extinction might provide a theoretical basis for systematic research in reading. Although linguistics recently has had some impact in reading, little has been done with communication theory. Perhaps such constructs as the source, the destination (or receiver), the message, the channel, the code, and the context might give structure to reading research. Finally, the work of psycholinguistics which focuses on language, cognition, information, and communication theory might prove to be a helpful model.

Obviously, no one science can be readily adapted to the questions asked about reading. Yet he who employs science to explicate the reading process must be prepared to search through many disciplines seeking clues. It is a task of tremendous scope and the likelihood of success by no means guaranteed. For although reading behavior is related to many other types of behavior, it is not isomorphic with any.

WHAT IS READING? WHAT IS NEEDED

Certain impediments to the development of a science of reading, however, can be dealt with immediately. Educators have so broadened their descriptions of reading that the discipline lacks structure and parameters. Because of its importance, reading has taken on the dimensions of a cult, and workers in the field use language resembling a cant. Before the reading process can be explicated, reading specialists must recognize two distinct areas of concern, and develop language that clearly differentiates the constructs being studied and described (4). The first area is reading behavior, i.e., how the organism functions while reading. Reading is unique to humans, and obviously has many dimensions. Reading behavior, in my opinion, can be subjected to scientific inquiry. The second area of concern to those in reading is reading pedagogy, i.e., how reading is or should be taught in the nation's schoolrooms. It seems to me that just as education seems unlikely to develop into a science, reading pedagogy also is not likely to become a science.

Both those concerned with reading behavior and with reading pedagogy need to develop language which more clearly describes the processes or behaviors studied and observed. Furthermore, it may be that the two languages at first may have little in common. Scientific language is not developed arbitrarily but rather is developed to define phenomena with greater precision. As reading behavior is subjected to more systematic investigation, special language hopefully will be utilized. Without greater precision in the use of terms to describe basic concepts, scientific communication will be severely limited.

The field of reading needs theorists as well as practitioners if it is to develop into a scientifically based discipline. Unfortunately the rewards for practitioners at present seem to exceed those of the theorists (3). Too often the work of theorists or researchers is dismissed as impractical for the classroom. Both groups are needed and do important work. If reading is to develop as a science, however, there is an urgent, immediate need for scholars who can bring together what is known about reading behavior. We need reading specialists who can sum up the evidence, as it were. Such scholars should classify what is known at present, what is suspected but unproved, and hopefully to help us all recognize what still is to be learned. From these efforts it is hoped that inquiry or synthetic theories could emerge which can be subjected to systematic experimentation and to the accumulation of still more empirical evidence.

A starting point might be to determine what behaviors or processes are unique to reading behavior. Perhaps we need to reassess the abilities mobilized in the reading act. Do we really think that the reading process is complex or is it the human being who responds in a complex fashion? These and many more questions need answers before we can develop a science of reading.

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The Relationship of College Reading Programs To Educational Counseling

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My major field is counseling rather than college reading. If, therefore, I am to discuss how these relate, I should commence with that much misunderstood term "educational counseling" and attempt to define and distinguish it, at least in my own conceptualization.

Informal conversation, on any topic, is prone these days to be entitled "counseling." Advice-giving especially may come under this rubric. We have "bridal counseling" for trousseau selection, "investment counseling," and so on. Professional counseling, however, is a purposive relationship leading to behavior changes or problem resolution. The essential and ultimate purposes of counseling are to improve the individual's ability to function effectively and to help him gain satisfaction in living.

Counseling was defined by C. Gilbert Wrenn in his *Student Personnel Work in College* (1951): "Counseling is a dynamic and purposeful relationship between two people in which procedures vary with the nature of the student's need but in which there is always mutual participation by counselor and student with the focus upon self-clarification and self-determination by the student."

Counseling, generally, focuses upon strengths rather than pathology, has as its goal the utilization of personal assets toward the end of self-understanding as a way point of behavioral change and improved functioning and gain in satisfactions.

Educational counseling has as its purpose giving the student the opportunity to benefit to the greatest extent from his educational experience. More narrowly conceived, educational counseling relates to the student's specific adjustment to the educational process and the struggle to learn.

Functioning effectively academically, however, involves more than mastering methods of studying. It involves the suitability of the particular educational institution for the student's needs; the suitability of the course of study in which he is embarking for his abilities, interests and temperament; his readiness psychologically to be in college at all; the balances and satisfactions in his personal-social-emotional life; and, of course, his complex of attitudes and motivations.

Vocational counseling helps a student to select his major, his goal in life, his career direction. Personal counseling involves his intrapsychic and interpersonal problems. When a student presents himself

for educational counseling, however, he says such things as "I'm not doing well in school," "I'm not getting as good grades as I should be getting" with perhaps a B+ average!), "I can't concentrate," "I don't know whether to drop out," "I'm afraid I'm flunking."

In Berkeley, we see over 5,000 students a year in our counseling center. In a school with as much pressure and competition as Berkeley, the business of succeeding academically is "where the student lives." Frequently the most difficult thing for him to do is to admit his problems in studying or failing to succeed academically. So he comes to us with a whole array of irrelevant presenting problems, "I want to know what I'm best fitted for," "I'm having trouble with a roommate," or "I want to decide between industrial and mechanical engineering," or any red herring under the sun. What his problem comes to ultimately is the question that is most difficult for him to express: "I just don't know whether I am the sort of person who can survive here and complete a college education."

At Berkeley the students are extremely bright. Our mean on the national norms for intellectual capacity is around the 98%. We probably have no one at Berkeley who is not intellectually capable of doing well in college; however, the major problems our students have are probably similar to those in other institutions. Parenthetically it may be said that high school is not the best preparation for university work. Studying as such is never taught; bright students get by readily on their "wits" and don't learn to study.

This is an element which is specific to our era. The pressures to prepare for an occupation or career, beginning with deciding on a major, working to get there, getting good grades in order to advance to the next educational step are always there. One must get into college, make junior standing, graduate to get into a Ph.D. program if one is to amount to anything. So the emphasis at all levels of education is to get good grades, not, unfortunately, to experience the joys and pleasures of learning. Learning becomes a chore and a distasteful one done in order to get the symbol that will enable one to go on to do something else which is equally as distasteful. Students are trapped. Not only does society make demands of them, but their well-meaning parents push them along to get good grades and keep on getting good grades. So this generation, not surprisingly, is disaffected with all this irrelevancy and has not engaged itself with the school's objectives and methods. Many at Berkeley, as at other schools, are disavowing the value system that insists that one works hard and gets good grades. They insist that one should not work at things one does not care about. Unfortunately, students cannot continue to work toward their own goals on a college campus unless they maintain their grade point averages as well. So this is their dilemma.

Behavioral or situational statements about the status of the student's lack of accomplishment do not go far in explaining the problem. Commonly, the student really doesn't know what the problem is, including that he isn't studying!

The counselor's first task is to assess and determine the level of difficulties, the areas in which the problems lie, those matters which are special and unique to each individual. They are often fully unique—no two alike—and take an infinitely patient approach to track them all the way to their lair. Besides the more pervasive and underlying personality and motivational problems, locating the specific items often requires great detecting. With a student I saw recently it finally turned out that the word "significance" on examination questions baffled him. In philosophy, a question on the *significance* of a kind of thinking meant he was expected to bring his own evaluation to bear; but in political science a question on the *significance* of a policy involved the history which determines significance with his own evaluation irrelevant. His inability to distinguish was conceptual, of course, but the basic clue to the way in which he bogged down.

When the global and the specific problems are diagnosed, assessed, understood, something must be done about them. What works for a student however awkward or strange must be carefully separated from what doesn't work, so that the student may retain those habits and attitudes he has built which relate well to his particular attributes. Those which do not stand him in good stead need altering.

As I see it, the way in which a person goes about studying is a projection of his total personality. And so, through the content of the approach to studying some basic personal traits may be dealt with and altered. Most common examples in a bright college population are passivity and rebelliousness. You can, I am sure, conjure up untold examples from your own experience. Passivity is one of the most pervasive personality traits that interfere with effective learning. I saw a senior not long ago who was having trouble with his current courses and complained, "I just can't seem to handle what is required of me." After learning that it was his reading courses that he was having the most trouble with, I asked him how he read. Very self-righteously he replied, "I read everything twice; I was always told that once is not enough, you should read it through twice and I do." When questioned about what he does when he is reading, he said, "I just read through the whole thing and then go back and read the whole thing again." By this ritual, he felt he had discharged his obligation to the course and he felt no responsibility for keeping his mind on the topic, reading purposefully, or trying to apply anything that he was reading about to his future. This kind of passivity, of

going through the motions, is an attitude learned through many years of experiences in school, home, etc. We have had success in finding that if we can help the student acquire a more active approach in studying this will generalize to other areas of his life.

Rebelliousness emerges most familiarly as the unwillingness to memorize, to do the "hard" learning required in such courses as languages, botany, anatomy, etc.

A wide range of attitudes toward oneself comes under the heading of the basic personal traits which show themselves in approach to studying, from lack of confidence and feeling of self worth to extreme self destructiveness. The cautious/reckless dimension falls into this category also.

Situational difficulties such as being overwhelmed, panicked, or even immobilized can be dealt with in educational counseling through content. Much of this dealing comes under the head of "motivating" or "changing attitudes," the assigned job of the educational counselor. Severe emotional problems or personality disorders lend themselves perhaps less well to radical change but are capable of some amelioration.

How does this conception of educational counseling relate to college reading and study skills programs? On a fine thin tightrope, I think, but if properly walked results in a splendid cooperative effort, working to a student's great advantage. The potential dangers exist on both sides of the line: that the counselor will default his responsibility (and it does involve tough hard work) and try to dump his student and his responsibility with him onto the answer to everything—the reading and study skills program. Of the range of counseling foci, difficult as are vocational, personal, and marital counseling, educational counseling is the most difficult. It requires intense and dedicated effort. A series of polls of our psychologists uniformly found that educational counseling is least liked. It requires the most time and highest level of devotion and skill. Although satisfaction on the part of students with our counseling is personally high, educational is least highly evaluated. On the other side, it may be very difficult for the reading and study skills person to stay out of counseling, not recognizing the high degree of diagnostic and therapeutic skill required of the psychologist.

Each needs to supplement the other, when one or the other doesn't do the job. The reading and study skills behavioral approach may change habits directly, and thus indirectly open horizons, improve confidence and feeling of self worth, affect motivation, etc. Or the program may provide knowledge and information and teach techniques, while the counselor works with the attitudinal, personal, and emotional material.

Relationships need to be carefully thought through, planned, tried, and evaluated. Relationships to work must be on a good personal and professional level between the staff of the programs, but also the mechanics are important. Appropriate criteria for original intake, spotting of need for the other program, transfer, interchange and consultation both ways are indispensable to most effective assistance to the student. No campus should be without them both, *and* working together!

The College Achievement Program: An Approach to the College Fail-out

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Achievement on the college level reaches beyond the basic skill of reading. Indeed, achievement on the college level reflects the integration of all language functions—listening, speaking, reading, writing—coordinated within a perceptual framework sufficiently free of emotional upheavals and self-doubt that a viable learning environment is maintained. To achieve successfully, the college student must believe in his own abilities, and he must also have at some point in his education developed internal standards of quality so that he can adequately and continually evaluate his own performance within the academic system.

Although this is admittedly an idealistic statement, its precepts should be considered when one designs a skills-improvement curriculum for the college underachiever. The aspects of self-confidence and quality control are fundamental to achievement, so much so that without their carefully guided inclusion within the course of study, remedial skill-building activities are viewed by the student as "more of the same," and are usually received therefore as stimuli for anxiety.

In 1963, Dr. Robert W. Pitcher, Dean of Students at Baldwin-Wallace College in Berea, Ohio, formulated a hypothesis similar to the one above and used it as the basic philosophy underlying an experimental program—a program specifically directed toward the college fail-out: *that student who has been dismissed from his college or university because of poor grades*. Entitled the College Achievement Program, it was the initial product of Dr. Pitcher's newly established Educational Development Center, a non-profit organization dedicated to helping selected students (those with unrealized learning potential) to experience success in academic endeavors.

Since its inception in March, 1964, over four hundred fail-outs, representing nearly two hundred colleges and universities in the United States, Canada and Europe, have completed the ten-week sequence. The Program has realized an overall success of seventy-eight per cent; i.e., three out of every four CAP alumni, having returned to college, are able to cope adequately with its demands.

SYSTEMS APPROACH TO CORRECTIVE INSTRUCTION

In order to create a proper learning environment, the College Achievement Program utilizes a systems approach to corrective in-

struction as its basic curricular principle. This approach includes a precise diagnosis to identify casual factors of the student's difficulties, and a selected course of study custom-designed in accord with that diagnosis.

The diagnostic testing service is available to any individual, whether or not he intends to enroll in the Program. This diagnosis, involving a battery of seventeen standardized instruments, renders a profile of his attitudes, abilities and skills. These results, once interpreted, are presented to the student (and to his parents if he so desires) in a subsequent interview.

Five areas of concern are covered in the interview:

- (a) An identification of what the student had learned in high school and how much of this has been retained;
- (b) An estimation of the student's academic potential;
- (c) An interpretation of the student's own appraisal of himself in a study situation;
- (d) An assessment of the student's functional skill level;
- (e) An evaluation of psychological concomitants which affect the student's academic behavior.

If he chooses to enroll in the ten-week program, a full-time course of study is designed for the student which will most directly effect improvement in the specific weaknesses cited by the diagnosis.

In order to be adequately selected in its course offerings, the Center's Central Curriculum Council has defined thirty-one program elements, each structured for a definite purpose, and each interrelated with the others. On a per-week basis the typical load for a CAP participant would incorporate forty-five hours' scholastic involvement (including class discussion and assigned activities). His course of study might include the following program elements: listening-note-taking skills, language fluency, reading improvement, writing skills, research techniques, book discussion, vocabulary enrichment, study skills, creative expression, goals orientation, and college placement.

CHARACTERISTICS OF THE COLLEGE FAIL-OUT

Throughout the past four and one-half years certain characteristics of underachievement have been identified through diagnoses and subsequent College Achievement Program experiences. Four of the most prominent are discussed here:

- (a) The fail-out cannot justify his impressions of college. (What he perceived college to be and what confronted him during his sojourn there were incompatible in his estimation.) He cannot formulate long-range goals, and therefore he feels that many academic tasks, having little relevance to immediate reality, are unworthy of concentrated effort on his part. Also, being relatively indifferent to grades or other extrinsic standards of the college, he experiences a lack of

satisfaction and seeks a substitute in instant gratification, apart from the academic.

(b) The fail-out has experienced a radical injury to his self-concept, especially in terms of his own scholastic abilities. He tends to focus upon his failures rather than his successes. His confidence has been disrupted, and he fails to see the possibility of implementing a change in his behavior. This self-critical sense of guilt and depression prevents him from identifying with a success model, and he may therefore begin to rationalize his failures, blaming other individuals or situations.

(c) Common also is the characteristic of language inhibition. In one of his language skills—listening, speaking, reading, writing—the fail-out may have functioned unpleasantly and/or unsuccessfully during earlier experiences. Consequently he has lost confidence in his ability to cope with academic demands through that specific mode. Because language skills are interrelated, the weakness in one has impeded the development of the others; thus a weakening of the developmental cycle is the result.

(d) A significant characteristic of underachievement—occurring in approximately twenty per cent of those tested—is a prevailing tendency of the fail-out to retaliate against his parents: the authority figures. Believing he does not control his own life, he inwardly rebels against those who influence his decisions. He attends college because they wish it, but he dominates the situation through non-attainment.

PROGRAM FOR CHANGE

In order to meet the needs established by these characteristics of underachievement, the Program's curricular approach includes the following criteria:

(a) The fail-out must focus his attention upon the dilemma in which he has become involved. He must realize that *underachievement* is indeed his particular and immediate problem. He may have rationalized otherwise, but the fact remains that he simply has not functioned in the academic situation to the best of his ability.

(b) The fail-out must accept behavior modification as his personal responsibility. He must be willing to deal with his dilemma in a systematic, objective and intensive manner, and he must be equally willing to motivate himself through his own volition.

(c) A third requisite involves identification of goals—by the fail-out himself—which in turn provides the specific program for change. He must see the relevance in the design of his course of study. He must also understand that the quality and quantity of his performance are to be determining factors in significant behavior modification.

(d) The realization of these three criteria sets the stage for the active contribution of a fourth: implementing the program for

change. This is the focal point of the Program. It involves an interplay of six distinct behavioral aspects which must be amalgamated within a period of ten weeks:

- (1) reconditioning of language inhibitions,
- (2) improvement of skills,
- (3) internalization of quality standards,
- (4) reduction of defensive mechanisms,
- (5) strengthening of the self concept,
- (6) reinterpretation of the student's relationship to his environment.

(c) The fifth and final criterion—validating the experience—can be observed through the participant's subsequent performance in college, or perhaps in the successful fulfillment of an alternative goal.

Since 1963, nineteen sessions of the College Achievement Program have been offered. During this time we have found certain curricular guidelines to be quite effective in fostering behavioral change:

(a) Provisions for student responsibility in the acquisition of desired outcomes. . . .

Individual program elements are structured to encourage positive reinforcement of successful experiences. The participant is guided through a series of activities, each dependent upon an understanding and mastery of those preceding it. As the sequence continues, he accepts more and more responsibility until eventually the staff member is phased out. Through this procedure he is able to realize his academic capabilities; he may also be able to redefine his concept of "work," for the first time seeing it as a succession of rewarding experiences instead of an imposed injunction of the establishment. It remains a fundamental premise of the Educational Development Center that only *minimal* student potential is released without active involvement on the part of the participant himself.

(b) Immediate feedback of evaluative observations. . . .

Positive reinforcement is furthered whenever the participant can visualize progress and gain confidence from it. Immediate feedback of evaluative observations is therefore an integral part of each unit or activity. Assignments submitted for evaluation are returned without delay, and suggestions therein must be pertinent to his specific situation and must contain alternatives for possible improvement.

(c) Involvement of the participant in evaluation. . . .

Not only is immediate feedback crucial to success, so also is student involvement in that evaluation as well. In each program element, quality control measures are utilized as much as possible through auto-evaluative techniques. It is most important that the participant edit and revise his own work—independently of an authority figure—so that internalization of standards of quality can be

fostered. The role of "teacher" or "instructor" is kept at a minimum; in all aspects of the curriculum, academic involvement is developed through the efforts of the participant and of the group.

(d) Assignments and allied activities designed to simulate reality. . . .

Reality simulation is that underlying characteristic of any element which makes behavior modification appear worthwhile to the participant. Each activity must in an observable way parallel a similar activity in an actual academic situation. Real transfer of learning takes place when the participant can see the relevance of the concept or skill in what he considers a "real" circumstance.

To support this principle, elements within the College Achievement Program promote skills development in college-oriented situations. Titles such as "College Text," "The Research Paper," and "Vocabulary for College" are common to a participant's course of study.

(e) Quantity control measures in terms of individual student-load. . . .

Quantity control is another important guideline employed in the College Achievement Program. Assignments must be regulated so that no participant is without sufficient assigned activities to maintain constructive involvement; similarly, no participant should become so overloaded with assigned activities that overall productivity is diminished. Under normal circumstances, a student's total assigned work load forces him to schedule time, identify priorities, and produce abundantly.

(f) The establishment and maintenance of specific boundaries—specified in terms readily understood by all concerned—within which the participant may operate. . . .

It is clearly evident that many CAP participants have mastered the art of manipulation during their eighteen-to-twenty years' association with adults. They have managed to overcome many obstacles by testing limits, alibiing inaccuracies and taking advantage of human weaknesses in their parents and teachers. It is therefore the Center's responsibility to set specific limits and to subsequently maintain them in a highly predictable manner, so that the participant is compelled to expend his energies in an application to work, rather than an evasion from it.

The Program's work completion system is a practical application of this guideline. The participant is made continually responsible for the completion of assigned tasks. Emphasis here is placed upon dependability and punctuality—those assignments not fulfilled as directed being considered deficient, and any deficiency not corrected within a specified time allotment being considered probationary, thus rendering the participant eligible for dismissal from the Pro-

gram. Throughout the ten-week period the student is encouraged to establish and follow a system of priorities so that none of his assignments is deficient.

Situations which necessitate temporary alteration of procedure are expected to develop during the ten-week sequence. The staff is prepared to cope with them through a predetermined course of alternative action. In this way the participant views the Program, not as a monolith, but as a system capable of reason.

FUTURE PLANS

The Educational Development Center is presently located in a sixteen-room frame house in Berea, Ohio. Because of physical limitations, enrollment in the College Achievement Program must be restricted. However, additional property has been recently purchased, and as soon as construction is completed, the Program will be available to approximately three hundred participants annually. Plans are also being considered for establishing satellite centers so that the service can be offered regionally.

In 1967, a total of 381,000 students were dismissed from colleges and universities because of academic underachievement. It is estimated that the annual fail-out rate will reach one million by 1980. The College Achievement Program is attempting to combat the situation by using inductive principles designed to promote self-confidence, improve basic skills, redefine the meaning of "work," internalize standards of quality, and get the student back into academic production.

Symposium on Rate Controlled Speech and Listening Comprehension National Reading Conference, December 1968

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Editor's note: The following presentation has been produced from a tape of the symposium. Credit for ideas and suggestions belongs to each presenter. Errors in transcription and in editing lie with the editor. The order of presenters in this paper follows the order of speaking at the symposium. The discussion period that followed the presentations is not reproduced here. It was interesting, but unintelligible on any of several different recordings: To paraphrase Les Cramer—It is difficult to edit an incomplete message.

HERB FRIEDMAN

I want to discuss the potential uses of compressed speech and slowed speech, that is, rate control of tape recorded speech. I dare say that anybody who has worked with compressed speech has been stimulated to think about the variety of different uses for it. I'm going to mention a whole lot of them in passing—some of which are going on right now, most of them are possible, and a few of them are far out. This is not a comprehensive listing, in that there are areas that I shall not mention.

I've divided the uses into five categories. The first category is the use of rate controlled speech as an information medium. As you know, compressed speech is capable of presenting information at rates of speed considerably higher than normal. (A good deal of research has indicated that, up to one and one half to two times normal speed, compressed speech remains completely comprehensible. I won't go into the details of how it breaks down now, but merely say that compressed speech can be used more quickly than normal to transmit information.) Some of the ways that it can be used are obvious: students who are trying to catch up on literature, slow readers, blind readers, librarians. Anywhere where information needs to be processed quickly

and anywhere where the auditory mode is an advantage. Compressed speech combines both of these qualities. Slower speech, expanded speech, also may be of some use. For example, for precise identification of certain speech patterns, or possibly for use in code breaking.

Another category would be to consider rate controlled speech as a training device. One of the things that it can do is provide experience in coping with material that is coming at a higher than normal rate of speed. If you can learn to do it, and some of our research suggests that you can, the experience of coping with fast speech, in itself, might be carried over in other activities. For example, with air traffic controllers, with students of a second language, transcription of shorthand, radio operators, etc. Any experience in dealing with a message quickly, or with dealing with more than one message at a time (which also means dealing with messages quickly) may be of an advantage. Such training may, and this we don't know, carry over to various cognitive skills. The experience of listening to fast speech may in fact make some changes in internal, or sub-behaviors, of listening. At slower rates, in speech therapy, for example, by listening to professional speakers, people with speech defects may be able to identify some subtle speech pattern and change some aspect of their own speech production. Well, you can let your imagination run free. As a training device rate-controlled speech has many possibilities.

A third category could be called aptitude measurement: the ability to deal with well compressed speech. I won't yet begin to define what dealing well with compressed speech means. But in a global way, the ability to handle compressed speech carries with it some other qualities that we are currently trying to investigate. Some of the components, sub-skills of listening, are involved in this. One component looks very much like a speed factor in language handling. Evaluation of semantic relations is another of the qualities that we seem to find again and again in our research. It turns up as a predictor of ability to listen to compressed speech. Phonetic memory and general vocabulary also seem to appear as predictors. Any of the tasks we mentioned as training devices, if useful as training devices, could probably serve as predictors as to success on the job. Some other research that we are doing suggests that a certain kind of sensitivity in language handling skills might also be a needed factor here. There are people with sensitive listening jobs, such as clinicians or teachers, who might conceivably find out something about themselves by learning the ability to cope with speeded speech. All the above on aptitude is very speculative. We see little evidence for it today, but there is some, that not too many people have investigated as yet.

A fourth category, I call a diagnostic device. Here we get a little more far fetched perhaps, but not out of the ball park. In psychopathology, the nature of your response to speech is considered signi-

ficant: given speech that is structured towards certain aspects of your experience, for example, the way a therapist might produce language for a patient to associate to. Speeding the stimulus has certain effects on how the person responds. It is conceivable that it might serve as a diagnostic device in certain areas by comparing the response of patients with response of so called normal individuals, using normative data. Cognitive language deficiencies might be diagnosed by structuring language, which is then compressed. Examining ways in which responses to various assigned tasks are different from the responses of non-defective subjects could lead to important diagnostic information. Comparing responses to a speeded second language and the same stimulus speeded in the native language, might lead to evaluation of foreign language problems. In reading deficiency, possibly by searching for listening deficiencies could confirm or disconfirm whether there is some central disorder rather than a number of other different possible reasons for the reading problem. Slowed speech might be used as a speech defect analyzer.

The fifth category is as a pure research tool. Compressed speech is a way of altering the tempo of speech within certain limits, without changing it drastically in other ways. The timing of the stimulus can be changed best by using a compression device, if the intent is to change the timing, but hold the other things constant. The nature of the task set before the listener can also be altered in many ways. The combination of changing the timing of the stimulus, its content, and the nature of the task can serve as an investigative tool for looking at the ways in which sub-listening behaviors occur.

Let me now list some critical questions that rise in the area of listening and how compression may be involved. The first critical research question is what are listening behaviors? I say behaviors because I think all of us know there are many aspects to what we mean by listening; many behaviors both overt and covert occur in the listening process. Listening is affected by the stimulus parameters; the nature of the signal changes the listening task. For a sample of those, I'll just recite a brief list of parameters: acoustic; phonetic; phonemic; morphemic; syntactic; overall linguistic property. Each of these dimensions can be examined, to some extent, independently, of the others.

If we accept that listening is a variety of behaviors, another way to manipulate the behaviors, is to change the nature of the task that you ask the listener to do with the stimulus. Let me give you a list of things which the listener might do: anticipation, in the general sense, of what is to come; prediction of specific things to come; a matching stimulus; the correction of the matching as the context grows; associating to the speech; some cognitive work on the speech; changes in receptivity of various aspects of future portions of the stimulus; concomitant autonomic changes resulting in new levels of arousal or activation. This is a very short list of a great many things that are

possible internally, even before the listener makes an overt response. Overt task requirements can be manipulated too. Again I will give you a list of ways that the task can be varied. You can ask the listener to identify, discriminate, match, store—short term or long term, repeat, paraphrase, translate, comprehend and answer questions, associate to, build on or continue the stimulus. I am sure that you could add many other things to the list. There are a great many things that you can ask a listener to do with speech.

If we accept that both the stimulus parameters and the task requirements determine some of the listening behaviors, then we may ask what is listening proficiency? Listening behaviors consist of rejecting as well as processing certain portions of the speech. I'll venture a private definition and say that selecting appropriate portions and/or aspects of the stimulus is one activity that is necessary. You must attend to the right things in that stimulus. It is necessary for the listener to filter out the portions that he doesn't want, and select the ones that he does. Then he must select appropriate listening behaviors for the task requirements. He has, in some way, to connect the internal work that he is going to do with the stimulus, to the parts of the stimulus that he has accepted. Then of course, what he does, he must do with accuracy and with any required speed.

Even if the listening behaviors were fully understood, there is the specter of measurement. How are we going to describe and measure listening behavior? In describing the measurement of listening behaviors, one of the things that we can do reasonably well these days, is to describe stimulus parameters. The first list I gave you was ways in which we can vary speech. We can do that, and we can measure pretty well from acoustics all the way up through linguistics, including temporal dimensions of speech. We can also very readily time latency—how long it takes to respond. We can time and describe the responses he makes to the stimulus. And then, and perhaps most important, we can set the tasks that we ask him to do in accordance to what we believe to be intermediate listening behaviors.

For evaluating listening proficiency, we need to examine the fit of the choice of listening behaviors against the desired response. In other words, does the listener do what is necessary for the task and does he do it well? We can do this, with some success, these days on what we might call a molar basis, by using such measures as intelligibility, comprehension, articulation scores, etc. But on a molecular basis, that is on the very quick, partially hidden, sublistening behaviors, we have not yet been very interested nor successful.

Speech compression may affect these listening sub-behaviors. It can alter the selective filtration of the stimulus. When speech comes to you fast, you may not do the same thing with it that you would do with it at normal speed. Changes that might occur could be elimination of some of the sub-behaviors, reduction of timing, change in

the latency of the response, change in the qualitative aspects of the response. I think we can use compressed speech to investigate listening behaviors. (And to some extent, at American Institutes for Research this is what our research is trying to do.) We can look at the nature and timing of all those changes in sub-behaviors which are dependent upon the proficiency of the listener. In other words, by identifying good listeners, we can then examine their changes in behavior at higher speeds. We can examine the listening proficiency at varying degrees of maturity of the listener. Hopefully we can then map out desired changes in sub-behaviors.

In summary, I have suggested that we attempt to identify some of the sub-behaviors of listening by controlling the tempo and linguistic qualities of the stimulus, manipulating the tasks set to the listener, and determining the content and latency of his response. Compressed speech gives us a unique tool to control the temporal aspect of the stimulus, and so affect the choice of listening sub-behaviors. Changes in performance (in a molar way) of good listeners across age levels, can give a pattern from which to judge and ultimately train for proficiency in listening at the sub-levels.

EMERSON FOULKE

I first became interested in research on time compressed speech several years ago; I entered into a contract with the Office of Education to explore the feasibility of using compressed speech to promote an improved system of reading-by-listening for use by blind students. Much of the research that we have done since then has continued to be related to this rather obvious and practical application. But since then I have become interested in other aspects of the problem. One of my interests is the general process of reading-by-listening and how it might relate to the use of time compressed speech. I'm also interested in the other side of the coin: the output of an oral reader. I would like to consider both of these briefly.

Let me start out by considering the oral reader. One of the factors that we can attend to is the rate at which speech occurs. The rate at which speech is produced does depend, of course, upon the situation that provides the occasion for the speech production. (Speaking rate typically observed in spontaneous conversational speech for example is about 125 wpm.) The person who is engaged in spontaneous conversational speech is confronted with a rather complex set of related tasks. He must concern himself with the composition of the message that he plans to deliver. Having composed the message he must then produce that message; he must operate his articulatory apparatus so that he will produce a display which can be then processed by another person, the listener. There is quite a lot of work to be done really. I think this accounts for some of the characteristics that we observe in the case of spontaneous conversational speech. For instance there is

a liberal conversational speech. For instance there is a liberal distribution of pauses. Most of this pause time can be accounted for by the needs of the speaker as he generates the message.

On the other hand the oral reader is not confronted with many of these demands. He does not have to compose his message. The words and the sequence of the words have already been determined. He can devote himself to the production of the message. Oral readers differ with respect to their ability to produce a display that is pleasing to listeners and that is comprehensible by listeners. It is my guess that the differences among oral readers can be described by the differences in the way they manage, what I call, rhetorical variables. These rhetorical variables are stress, vocal inflection, and the amount and distribution of pause time. Different readers, of course, manage these differently. I would also like to suggest that these rhetorical variables constitute some of the information in the message that is produced by the oral reader. The words that constitute the message specify some of the information. The sequence in which these words are arranged constitute some of the information in the message. But beyond that, it may very well be that the rhetorical variables constitute some of the information in the message. There is not too much research to bear on this at present.

Pause time has been looked at by quite a few people. Dr. Miron has done some research on pause time. The research that he has done supports the above suggestions. The other variables, of stress and vocal inflection, have been examined in some studies, but I am not aware of any studies in which they have been looked at specifically in regard to information transmission. I have directed a master's thesis in which pause time was manipulated. The experimental selections were compressed in time by various amounts. Then pause time was restored to the selections. The restoration was made at phrase and sentence boundaries. When the comprehension of selections in which pause time had been restored was compared with comprehension of selections in which pause time had not been restored, there was in all cases a significant improvement in comprehension. Comprehension was never restored to the level obtained from selections that had not been compressed at all. But the insertion of pause time did restore comprehension significantly. This was our first effort in attempting to investigate the significance of pause time in listening selections. We will be pursuing this area further and looking carefully at both the absolute amount of pause time and the relative amount of pause time that are useful in understanding the output of the oral reader. We also hope to go on to investigate the other two variables that I have mentioned.

I have talked mostly about the output of the oral reader and how various features may contribute to making this output understandable to a listener. It is also interesting to look at the tasks that confront the listener, who is essentially reading-by-listening. Possibly we can

compare reading-by-listening to obtaining information from the print-page-display. The person who reads visually, who processes the print-page-display, is confronted with a display that has important spatial characteristics. This means that he has considerable control over the amount of information that he can retrieve from the display during a given fixation or perceptual act. He can continuously vary the rate at which he processes the display. He can take advantage of the redundancy in the display. He can look ahead. For instance, he probably engages in continuously generating expectancies regarding what he is going to encounter in the display, and as he glances ahead he will either confirm or disconfirm these expectancies. If he disconfirms them, he can then look back for a closer analysis. One can, at least at a fairly superficial level, describe the behavior of a person who processes the print-page-display as behavior in which his reading rate is continuously varying in accordance with the momentary demands placed upon him as he processes. He has access to a great deal of information in the display because of the fact that it is a spatial display. On the other hand, the person who reads-by-listening is not able to do this. The listener has direct access only to the information specified by the acoustical energy that is present at a given instant. He does of course have some access to remembered listening experiences: he can compare what he is hearing with what he remembers having just heard. But I would submit that what he remembers is in many cases not as accurate as the information that is directly available to the visual reader. In this respect the listener is somewhat at a disadvantage. Also, under normal circumstances, the listener can not vary the rate at which he processes the display. This is determined for him by the rate at which the oral reader happens to be speaking. Rate is not determined by his own listening requirements, but by the articulatory requirements of the person who is producing the speech. Obviously he cannot listen ahead and he cannot listen back as the visual reader can look ahead or look back.

Well, this brings us around to the point where we might want to consider ways of interfering with the normal listening situation. Time compression would be an obvious way in which we might choose to do this. One could for instance, provide the listener with a situation in which he could increase the rate at which the display is presented to him. This would not enable him to listen ahead or listen back in the sense that the visual reader can perform this operation, but at least he could be given control over the rate at which the display is presented to him. Ideally, we would like to think of a system in which the listener had direct control; that is, in which he could adjust presentation rate in accordance with his continuously changing demands. Unfortunately, at the present time, this is not really practical because such compression equipment would be too expensive, but this may not ultimately be the case.

MURRAY MIRON

I start out with a set of biases about the nature of language. This is probably because I call myself a psycholinguist. One presumption I hold is that language is innate. I have to express that statement in its dogmatic form, because I am tired of the mamby-pamby that I hear my psychologist colleagues make when they say that people are born with a facility for language. I don't think that goes far enough. I don't consider the two-year-old an intellectual giant, and yet, when I look at language, I find that whatever he is doing when he learns language, he is doing a monumental thing. He must be a genius. Even those with very little intellectual equipment, are doing a monumental thing—learning language. So I presume, that in fact, they aren't learning it. They are born with it. Human beings were born to talk. The first ape that swung down from the trees was probably talking.

My second presumption is that speech is the natural system. That reading and all of the other forms of communication are derived, are secondary, and are relatively unimportant biologically. They represent forms we have added on to our biological inheritance. If that is the case, I would expect to find much more variance in the ability to read and to process information by these secondary systems than I would expect to find in listening. And, in fact, what data we have seems to indicate this is so. The variability in listening is far less than what we find in reading. You seldom find listening disability cases, people who are clearly very, very bad listeners. Almost everyone listens at least moderately well.

I also make the presumption that there is a natural homeostatic condition that determines the rate at which most people prefer to talk and the rate at which most people prefer to listen. In fact, if we look at the human being as a speech compression device, because he has control of his rate, we find that his abilities to compress or slow his speech are very, very narrow indeed. That is, he has a very limited range by which he can compress or expand his speech output. At some point, if he tries to expand his speech output too much, he himself loses the train of thought, the prosodic features, the intonated features that govern the listeners sentence comprehension. The speaker's own composition of the sentence is lost: he begins to sound as if he is reading a list. On the other hand, if he goes too fast, his articulators can't keep up. He creates all kinds of errors, and it's much more effortful to go back and retrace and correct these. So, in general, we find that a normal speech rate of about 160 wpm isn't varied very much from one situation to another.

I'm also going to make the presumption from this innate language model that the human listener is not a passive filtering device. That is, the listener does not listen to speech, filter it, and categorize it in some taxonomic system. Instead, he is an active generator. (Obviously here I am following Chomsky's line.) The listener produces models,

hypothesis about what it is that he is hearing. And he is usually far ahead of the speaker. That is, he is trying to stay ahead of the talker as he tries to stay ahead of himself when he is talking. I presume, then, that though speech sounds as if it is linear, just like the printed page looks as if it is linear, that it is not. It is a deceptive appearance. Speech is not linear, it is time-bound, but the organization processing of that speech is hierarchial in form, just as I am sure any efficient reader would have to hierarchially organize the printed page. He wouldn't follow along line by line or word by word. It would be a very inefficient process, and one that would be foreign to the nature of language in general.

From those standpoints then, it interested us to manipulate the syntactic, hierarchial organization of speech material in an attempt to explore the parameters that govern comprehension from the standpoint of syntax. It was this that lead us on to the thought that perhaps pause time is the natural mechanism by which both the talker and the listener organize, indicate, mark the hierarchial organization points that allow processing time. So we have been manipulating pause time in our research.

I'm not very sanguine about the uses of compressed speech in general. Compression at two times normal rate would be something like 320 wpm. There is a high cost to pay to obtain this rate: the equipment that is necessary; it is not spontaneous; you have to store this on a temporary medium; you can't get ahead of the talker. This is a tremendous price to pay for what seems to be very little gain compared to reading. (I wouldn't have very much hope for any student who read only at the rate of 320 wpm.) What we need to do is get up to very much higher rates, if we are talking about listening for information processing purposes. Listening will always, I think, be restricted to the casual, the trivial uses of communication. Reading will always serve man as the efficient way of processing information. Nevertheless, we thought that there might be some possibility of upping listening rates, to far beyond what are normally encountered. We are shooting for rates around 1,000 wpm, which would now suddenly become competitive with reading abilities for most people, but capitalizing on the inborn talents that people have with respect to listening abilities, instead of the derived system of reading. We are trying to obtain such listening rates by manipulating pause time.

We find that pauses act anomalously. At first, it looks as if pause time should be dead energy time. Nothing is happening. There is no acoustical signal during pause time. On the other hand, it is obvious that pauses are used to organize speech and to organize listening. When we ask people to judge how fast they think a message is being spoken, we find that they actually judge messages which have been speeded up by pause deletion to be slower. Then their companion colleagues

judge messages that are at the same rate, but which were produced by the random deletion method of the normal speech compression process. We are trying now to set up equations to handle the prediction of perceived rate from actual rate.

The first equation we need is to get judged rate, the psychological assessment of how fast the message appears to be being displayed as a function of the measured rate. We know how to get the judged rate; that is a psychological scaling task. What we don't know is what is the stimulus parameter that will best predict judged rate. We are playing with the parameters of what are the best units of measurement that we can use for measured rate. Well, it turns out that the traditional measure of the word turns out to be a pretty good measure. The curves that we have been able to fit so far are complex equations. They are, as other researchers have indicated, a log function: judged rate is a log function of measured rate. We are now able to account for something over 80% of the obtained variation in judged rate, so we are pretty certain that we are on the path to understanding what governs how fast people think you are talking. We work now from that first equation to plug in for the value for predicted judged rate: we predict what the judged rate will be, given the measured rate of the message. It is cumbersome to go around asking subjects how fast they think the message is going and much easier to put it through a machine or have an assistant count the words and measure the time. So a formula for predicted judged rate would be most helpful. Then we want to go from this task to be able to predict what the per cent of comprehension of a message will be. As we trace our way through these equations, we must conclude that pauses behave anomalously. We find that they are outside the predictive capacity of these general equations, that pauses would be better predicted by a separate equation of their own. We are trying to do that now.

In general, unless we can find some hopeful results, in something beyond 500 wpm with speech compression work, I think we will be doing people a disservice going around the country offering this as a significant break-through for efficient communications. I am coming more and more to the conclusion that unless we get up to much higher rates, we'd better stop selling it as an information processing procedure and instead focus on speech compression as an interesting research tool for manipulating speech signals and for getting at some basic information about the comprehension process in general.

DAVID ORR

I don't believe there has been a single correlation coefficient quoted so far in this symposium. That's good. I have the feeling that we often get bogged down in the nitty-gritty of research too deeply and lose sight of intuitive approaches, for example, the complex and esoteric

measures derived to measure readability. A recent study has some 30 or 40 different variables. We lose sight of the fact that most of us can tell if something is readable, in some sense of the word, by looking at it and reading a bit of it. Now, I'm not saying that research isn't valuable, but I think intuition is valuable too. Intuition is valuable to cut through some of the formality of research, when we get carried away with the research itself.

I would like to offer some ideas and issues that bear on the whole phenomenon of communication, in which compressed speech, or rate-controlled speech is a part. I'm going to assume a point of view which stresses highly the individualistic nature of the communication process. I will start with some comments on the psychological nature of listening comprehension. It seems to me that we have to start out by talking about what is meaningful to the individual. What is meaningful to the individual is a cumulative product of the individual's personal experience. If something is meaningful to Johnny, it is not necessarily meaningful to Susan.

Let me point out that I am viewing the educational communication system as being a receiver-oriented system. My colleagues may disagree with me on this point, but it seems to me that we place too much concern on the characteristics of the stimulus and not enough on the characteristics of the individual. This must be a receiver-oriented process. It doesn't make any difference if the teacher teaches, what you want is the student to learn. And students do learn in spite of teachers and how they teach, in spite of communicators and how they communicate.

What the individual is doing when he is comprehending a message, whether it is a listening message or a reading message, is associating the concepts that are coming in through the sensors to a pre-existent cognitive structure. This cognitive structure is a product of the individual's lifetime experience, interacting with his genetic potential and the structural characteristics of the organism. Something is meaningful if it can be easily integrated into the cognitive structure. If it's not meaningful, with respect to this individual, it's something for which he must impose an organization or structure. This explains the well-known phenomenon that meaningful materials are learned more easily than non-meaningful materials. They fit into the cognitive structure. For non-meaningful materials, including nonsense syllables, the individual has to develop some sort of temporary organizing principle or learn strictly by association. It explains why generalizations (principles and understandings) are retained longer than facts: generalizations are themselves organizing principles and they fit much better into the cognitive integration than pure facts do. There are obvious differences in reading and listening, but I would like to propose that these are similar processes in respect to cognitive integration.

I would also like to expose the activity vs. passivity myth. We have done a lot of talking in the past ten years, in the context of programmed instruction, about the importance of active learning. We get people to make responses to 4,000 frames of an algebra course, etc. We tend to bad-mouth the lecture process, on the basis of the fact that it isn't an active learning process. It's a passive process; you're just sitting there listening, and I can't tell if you are learning anything because you haven't behaved yet. But it seems to me that the activity that we are talking about in active learning is not the activity of writing the response down on a piece of paper, although that may be a manifestation of activity. The activity that we are talking about is the mental effort associated with attempting to place incoming concepts in the context of one's existing cognitive structure. This can happen in a lecture situation.

When we speed up the input process, we must also speed up cognitive integration activity, otherwise we won't get comprehension. What we are asking really is what is the design limit of the central processing unit that we are working with, namely the human brain. We don't know very much about this yet. Compressed speech may give us an avenue to explore this question. It seems to me that at some point along the line, we're going to overload the design limitation of the organism. I don't know where that point is, but we haven't reached it yet. We know we haven't reached it, because we know that we can teach people to read faster and to go through this cognitive integration process faster than they normally do. However, we don't really know what the upper limitations are for the average individual. Time-compressed speech should break down at the point at which it overloads the design level.

One variable of concern in examining comprehension is readability. It appears to me that we are never going to be able to account for much more than 50 or 60 per cent of comprehension variance with an approach which takes the measurement of readability over a group of people. I would propose to you, in line with my general thesis here, that part of the concept of readability is idiosyncratic. Something which is readable, whatever that is, to one individual is not necessarily readable to another individual. Those things which we have measured with the traditional formulas (and perhaps some of the things which we are adding with the new formula in the way of measuring linguistic characteristics of the stimulus) make a difference in readability. But they can only account for that portion of readability variance which is based on the commonality of the communication experience. The idiosyncratic aspect, that aspect of difficulty which is associated with the experience of the individual, is not going to be predictable by a general formula. Is it going to fit well into his cognitive structure? That part you can't get in a general formula.

We have several ways to go about measuring comprehension. The traditional test, that everybody criticizes but nobody does much about, could be modified. One thing that we might try to do would be to try to operationalize the process more than we have. One way to do this is the so-called domain concept. Pick a subject matter area, define it, and write a set of test questions so that both from a construct standpoint and a content standpoint, the test is indeed a fair, proportionately representative, sample of the domain which is defined by that body subject matter. Then, and only then, can you attach some real meaning to the scores you get out of comprehension testing. You can do this with multiple-choice types of test, with all their other limitations. Another way would be to use the idea of overt behavior as a measure of comprehension (what I have called operationalism). This means that if you want to know if a person is comprehending something, your stimulus is a set of directions of some kind and you observe his behavior. You attempt to determine whether his behavior was appropriate and relevant. Obviously you can't use this in all situations, but where you can apply it, I think it does give you the most relevant measure of comprehension that you can have: the appropriate behavior of the receiver. Finally, the advantage offered by the cloze procedure seems to tie in to this problem of the individual's idiosyncratic cognitive structure. The cloze procedure does indeed take into account the cognitive structure of each individual in the form of the transitional probabilities between words in the message.

Previous speakers have mentioned some of the differences between reading and listening. I would like to emphasize the similarities of these behaviors in terms of the central processing task which has to be done: the comprehension task. By the time the child gets into his sixth year, he is already a pretty good communicator. It seems to me that we do not take nearly enough of this already existing communication system into our efforts when we try to teach a child to read. To be thoroughly heretical, I wonder if we don't actually retard the intellectual development of children by attempting to teach them to read. I wonder if we wouldn't be better to focus on the primary system, the oral communication system, to devote our efforts to the development of concepts and communication in the auditory vein, rather than bringing the child's intellectual development to an almost complete standstill, while we try to shift him over from an auditory system to the translation of little scribbles on a piece of paper. It takes the average child six years of school, before he can communicate as well via reading as he could via listening to start. That's a long time to slow him down. I wonder if we wouldn't be better by starting reading at the fourth grade level.

Where do we go from here in respect to the uses of time compressed speech? There are statistics to show that the average adult

spends something like 70 to 90 per cent of his time in oral communication activities, either in listening or speaking, not reading. There is indeed a tremendous implication involved in doubling the rate of auditory communication. Think of all the American college students who are sitting in a course right now, listening to somebody talk even as you are listening to me. Think of the number of man hours involved and place some kind of economic value on it. What is the price of a couple of speech compressors as compared to all that? We cannot use time compressed speech, in practical application to education, in all situations for all subject matters. I'm proposing the selective use. We need more information about just how we can do this. But I certainly feel that there is a very important efficiency gain to be had from educational use of compressed speech.

The study of interaction between reading and listening, as a communication phenomenon, can now begin to be studied through the use of compressed speech as a research tool. For example, let's suppose that we take a group of average students and give them intensive training in rapid reading: Does it do anything to their listening comprehension? Before we couldn't ask that question, now we can. Or turn the problem around, take a group of students, give them intensive training in listening comprehension, as a function of listening rate: Does that change the characteristics of their reading behavior? Again, this is a question we couldn't ask before and I think it's a fascinating question. Such studies may enable us to attack this whole problem of central processing and the similarity, if not the identity, of the listening comprehension process and the reading comprehension process.

LES CRAMER

There are two common methods of compressing speech, which have not yet been clearly defined in this symposium. If you make a recording at 16½ rpm and play it back at 33 rpm, you will hear it in half time. However, all the frequencies go up so that it sounds somewhat like Donald Duck. It does compress the time, but it has what is known as attendant frequency distortion. The process that most of us here have been talking about is another means of obtaining time compression of speech. Imagine a strip of recording tape spread out lengthwise. Cut the tape every quarter of an inch. Take every other quarter inch tape and throw it away. Take the remaining quarter inch bits and splice them back together. You have arbitrarily thrown away half the tape, so what was an hour of tape can now be played in half an hour. You will not get frequency distortions using this procedure. This compression technique is actually done using electromagnetic sampling procedures.

At the time of my original entrance into this field, I heard some time compressed samples from Grant Fairbanks' apparatus at the Uni-

versity of Illinois. I was particularly impressed with the rapidity with which I could come to understand speech at rapid rates. When I first heard a passage at $2\frac{1}{2}$ times the normal rate, it was like viewing a passage on a reading machine that was going a little faster than I could read: you can see things going by, sort of, and you can get a little bit here and a little bit there, but you really can't make sense of it. But all of a sudden, by the time I had listened to compressed speech only 2 or 3 times, it was perfectly clear; I could understand everything. It didn't take much time to learn to understand the distortions that take place when you drop out bits of speech.

It was not clear to me what would be the optimum pieces to leave out of speech: Should we cut a quarter of an inch out of a tape? a half an inch? an eighth of an inch? Or to put it into better terminology, we should talk in terms of time: How many milliseconds should we drop out of the speech? Grant Fairbanks has done some work which indicated that somewhere around 20 milliseconds might be ideal. (This was done on comprehension passages. Earlier work on intelligibility had not asked this question.) So it appeared that we needed to know how we could produce the most intelligible speech. In this respect, I want to say that the work that Drs. Orr and Foulke have done was great. I felt that I could supplement what they were doing. It seemed to me that this was an abnormally fast rate if we expect the listener to listen to the distortions that take place, decode the stimulus, and fully comprehend the speech at the same time. So I decided to see what I could do to improve the intelligibility of the speech signal.

One of the clues that this could be done, I found in listening to one of the passages that Grant Fairbanks had prepared on meteorology. There is a sentence that says, "It is now possible to predict haze and cloud cover two days in advance." When that was speeded up to $2\frac{1}{2}$ times normal, the 'now' was clipped short. The 'w' sounds exactly like a 't'. The sentence now sounds like, "It is not possible to predict haze and cloud cover two days in advance." The exact opposite of the intended meaning of the sentence. Every other word in the sentence was clear: just the one word being clipped short completely reversed the information from the sentence. This made me feel that comprehension could be a serious problem from only a small amount of difficulty in the intelligibility area. In other words, if we can improve certain words or phonemes, perhaps we wouldn't have the reversals or other problems that now and then arise in the comprehension of time compressed speech. In order to assess this, I prepared passages at seven different rates from 50 per cent to about 78 per cent compression. (The percentage figure is the percentage of speech that is deleted. Seventy-eight per cent is almost 5 times normal rate. We were working up to 998 words per minute.) The question I asked was: How much speed should we throw away? Dr. Fairbanks was a phonetician.

He was interested in how much redundancy is there in speech, so how much of it can we delete. I asked the same question he had posed earlier, and set the experiment up that way. However, when we looked at the data from the experiment, it became clear that the critical interval was not the length of the sample that you delete, but the length of the sample of speech that you keep. It turns out that what you save is important primarily because that is what you have to perceive. You can't process speech that you don't have available for your system to filter. To use Herb Friedman's model of processing of speech by filtering, I would also maintain that we do have to filter speech, but if the signal isn't all there, then we have a problem trying to filter an incomplete signal.

Emerson Foulke mentioned the importance of the speaker. From my work, I find that it is very critical that the speaker maintain a uniform pitch, that his voice be more or less a monotone voice for periodic sampling. If he modulates his voice by going up and down in pitch, it won't compress properly as the pitch changes. It will be ideal at one pitch, but not optimum as the pitch changes. A good proof of this is that when I ran some of Julie Andrews' singing from the *Sound of Music* through speech compression, some of the tones came out beautifully, while others sounded as though she was gargling while she was trying to sing. This particularly affects the semi-vowels v, l, r, and w. These sounds tend to flatten right out if not hit at an optimum level. My present hypothesis is that ideally vowels should be compressed, with consonants, fricatives, and semi-vowels left alone.

In addition to figuring what would be an optimum method of processing, I was also concerned with what would be the ideal way of presenting speech. At the time, Orr and Freeman were presenting compressed speech using a loud-speaker, on the basis that this would be a typical classroom presentation. On the other hand Boor, who was working with Foulke, was using earphones, because he had found that reverberation affected the signal. You have probably all had the experience of being in a big auditorium, that was intended for music, and listened to a speaker. It is frequently unintelligible due to reverberations. As speech rate goes up, this same thing happens in smaller and smaller rooms, so that speech at about 2 to 3 times normal rate will tend to give serious reverberations in a normal size classroom unless the room is especially sound proofed. We did find an average of about 25 per cent greater intelligibility when presenting speech by means of earphones, as compared with loud-speakers.

Another way of presenting speech is to take a recorded tape, cut it into pieces, and make two tapes by placing all the even pieces into one tape and all the odd pieces into the other tape. You can then play the two tapes, in synchronization, so that one sample is going to the left ear and the other sample to the right ear. This is known as di-

chotic speech compression. All the original speech is being presented to the person and it does come out amazingly intelligible. The brain has the ability to integrate this and make it very intelligible. I'm not sure yet what the neural process is or how it is done, but there seems to be a great difference in the ability of people to integrate the speech from the two ears. Some people can do this very well and others have much difficulty.

I observed another phenomenon that you might be interested in. At one time I wanted to try introducing pauses to time compressed speech. I didn't have my script with me and I had the speech coming out of a computer. I was trying to listen to it and stop the computer at the proper time for phrase junctures and sentence endings. I found that without having the script in front of me, it was difficult to flip the switch fast enough. Rather than make a lengthy trip back home to get the script, I thought that I would just copy the speech down. So I listened to the speech at $2\frac{1}{2}$ times the normal rate and tried to write out a script that I could then read. I found that I got most of the speech by stopping and starting, once in a while going back a little bit. Then I went back to the beginning and started listening again to make sure I had it correct. Lo and behold, there were something like 25 mistakes. In every case, what I had written was a simplified version of the original, in terms of the number of syllables! I suggest that this might be a method for text writers to use to simplify textual materials. In many cases, it was such things as leaving out a 'however' or 'inasmuch as,' but nevertheless it was an interesting result. I have done no more than observe this, but I think it most interesting.

We found another interesting thing when we were testing what the optimum discard interval was. One of the samples had a discard interval of 95 milliseconds, and on this particular sample we had some bizarre effects. With this length eliminated, people began to project things into the speech. When we were reading what people thought they heard, we found that they were writing down some rather strange things. In one case someone wrote, "Does California grow the orange?" I couldn't imagine what we had presented, since this wasn't on our list. What we had presented was, "Does a cow have kittens or horns?" At another place on the list, several people had written this same sentence, "What is a Catholic worth?" There was nothing religious in our experiment, so we turned back to our list. The question that was asked was, "What does a cat lick with?" Another example was, "Which is Doctor Mike O'Day?" or "Which is Doctor Michael Day?" The real question was, "Which is darker, night or day?" We may have the possibility of an auditory TAT or maybe Rorschach test by leaving long blanks and seeing what people fill in.

'Grammatical Sense' as a Factor In Reading Comprehension

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If a sentence is the unit by which ideas are communicated in English, then the basic task of a reading teacher is to help others attain the skill of extracting meaning from a sentence with efficiency and skill. An obvious statement of the obvious, but sometimes a return to fundamentals helps to assess the task.

A sentence in English is an arrangement of words which communicates an idea. The problem is to be seen in the topic sentence of this paragraph. The phrase "which communicates an idea," by its grammar (the 's' on communicates' makes it singular) attaches itself to "arrangement"; by its position in the sentence, it attaches itself "words." The resultant confusion of possible meanings illustrates the point to be made in this discussion—equally important in sentence meaning are semantics and syntax.

Most reading programs are primarily concerned with widening the semantic background of the student; only incidentally are they concerned with the contribution syntactical skill can make to comprehension. Everybody teaches vocabulary. Most observe the hierarchy of word-attack skills—sight recognition, phonic and context clues, structural analysis, and finally, the dictionary. Most vocabulary exercises observe the "whole word" convention for word meaning; each word matches with a synonym or antonym. Under the structural analysis section, sometimes 'families or words' are stressed. Certainly the 'whole word technique' (recall of previous experience with this particular set of graphemes) is fastest; it does not, however, encourage the observance of two facts about word meanings: (1) most words have several, often widely divergent and sometimes contradictory, meanings, and (2) many words, above the three, four and five-letter level, are themselves composed of several units of meaning.

Linguists call the minimum unit of meaning the *morpheme*. Morphemes can be linked, by specific strategies, into words. An emphasis upon the meaning unit and the significance of the pattern of linkage helps to produce the flexibility in vocabulary so necessary for actual comprehension. Those who construct reading programs and exercises might profit by reading a good modern morphology. Especially valuable is the inclusion of phonomorphology in the plan for instruction; many programs, for example, teach "-tion" as meaning "the act of"; in reality it is one of the suffix strategies by which nouns

are made, in this case usually from verbs. "Action" means "the act of acting," but "subscription" as "the act of subscribing (writing one's name under)" is obsolete; now it usually means "how long one's periodical comes before he has to pay again." Such units of grammar which remain a part of English words, usually suffixes, can profitably be taught as grammar and not as semantics.

Syntax as a factor in meaning is even less emphasized. Perhaps the reason is that most reading teachers had their grammar either under the usage school (where there was only the rule of the ear) or the Latinate grammar school (where the principles rarely fit very well). As a gadfly and elder practitioner in this conference—I should hesitate to call myself an 'elder statesman'—I wish again to suggest that modern grammar offers some insights into the language which can help kids to learn to read.

The meaning of a sentence in English is not the sum of the meaning of the words—it is more.

Bear ties fish.	Fish ties bear.
Ties bear fish.	Bearfish ties, etc.

all mean different things. There is the semantics—the referents of the words, but there is the plus; the syntax has meaning too. There is no word to designate the unit added in syntax (as *morpheme* is the unit of meaning); I suggest that "*grammeme*" supply the lack. A *grammeme* is the minimum unit of syntactical significance used in communication. All sentences have two kinds of meaning, syntactical and semantic. A knowledge of the morphemes and the grammemes produces understanding.

In 1967, I made some comments at this conference designed to stress the importance of the recognition and drill on grammatical meaning in teaching reading. Then I addressed myself principally to the syntax of basic sentence patterns with the supplemental and often contradictory signals furnished by word order, inflection, and function words in the grammar of a sentence. Today I would like to discuss the area of transformational theory and suggest some concepts which are units of understanding within that theory—concepts the recognition of which makes the "extraction of meaning from a sentence" more efficient and speedy. Any contribution which I may make is not innovation in theory, but may be in organization and rationale. Most discussions of transformational grammar present transforming as interesting tricks to be done with the language, as a most complicated technique of analyzing extant sentences, or as a simple list of many, unrelated processes. I believe all transforms are done for a purpose; the purpose is signalled by a "marker" within the sentence, and the early recognition of the marker-purpose simplifies the process of extracting meaning.

Transforms may concern themselves with one sentence or with multiple sentences. Single sentence transforms are done for one of three reasons: to make questions or negatives, and to change emphasis. In order to illustrate single sentence transforms, a basic, four-slot sentence may be used; it is the type known in conventional grammar as the indirect-object sentence.

TEACHERS TEACH STUDENTS READING

Emphasis transforms are done on single, basic pattern sentences in order to stress a specific element in the sentence. The actor is emphasized by the expletive transform:

It is a teacher who teaches students reading.

The action is emphasized by the addition of an auxiliary to the verb; any auxiliary will work, but "do" and its variants stress best:

Teachers DO teach students reading.

One of the complements may be emphasized through the passive transform:

Reading IS TAUGHT students by teachers.

Students ARE TAUGHT reading BY teachers.

Any of the end words in a basic pattern, including an adverb which may be added to the pattern, can be emphasized through the *periodic transform*; probably such a transform accounts for the placement of single word adverbs at the first of sentences.

Reading, teachers teach students.*

Students teachers teach reading.

To students, teachers teach reading.*

Quickly, teachers teach students reading.

Question transforms are of two kinds: leading questions (yes/no) and information-getting questions. There are three kinds of leading question transforms:

Rising pitch Teachers teach students reading? primarily oral

Function word Teachers teach reading, don't they? mostly oral

Auxiliary first Do teachers teach reading? This is a two-step transform if the base sentence does not have an auxiliary; First there is an *action emphasis* transform (Teachers DO teach students reading).

Then the question transform is made.

Information-getting question transforms use the substitute word pattern, usually called the *Wh Transform* (*who, whose, whom, which,*

*The comma is necessary only when the form of the word put first in the periodic transform may cause confusion with a modifier of the actor. In the second example, the plural 's' keeps 'students' from being an adjective.

what, where, when, why and *how* are the substitute words). The substitution can be in the normal slot of the basic pattern:

Who teach students reading?
Teachers teach students what?
Teachers teach whom reading?

Usually, however, the interrogative word takes the initial position in the sentence through an emphasis transform or a kind of combination of the periodic and the auxiliary first transform:

Teachers DO teach students WHAT?
What do teachers teach students?

Negative transforms are made by adding an *n't* or *not* to the basic pattern; the former is the oral pattern and the latter the written one; to use *not* in speech is a distortion and results in emphasis on the negativeness. Negatives can be added directly to auxiliaries; most content verbs cannot take negatives. Only those content verbs which have homophone-homograph parallels as auxiliaries retain the ability to take a negative from their function word use in content word areas; often these words can take *n't* but not *not*.

Teachers do not teach students reading.
Teachers don't teach students reading.
never Teachers teachn't students reading.

It can be Teachers haven't students but never Teachers have not students. The emphatic and formal form requires an action emphasis transform:

Two negative elements in a transform merely increase the negative quality; they do not cancel each other and make a positive. In writing, at the high, literary level, however, the conventional grammar rule may operate so that Teachers never do not have students actually may mean that there are students.

Multiple sentence transforms are made to establish the "pecking order" of the ideas in the sentences. The ideas may be equal; then the relationships shown are sometimes called *co-ordinate*. They may be unequal when the relationship is *subordinate*. An addition or subtraction, plus or minus, quality of the juncture may be conveyed. The whole strategy shows degrees of relationship, varied from the deliberately vague to the very specific. The kinds of multiple sentence transforms may be illustrated with 4 sentences, basic in patterns and called K for kernel sentence.

K ₁ Water runs downhill.	K ₂ The water is fresh.
K ₃ The rains fell.	K ₄ This is unusual.

Very vague	Water runs downhill; the rains fell.	} Additive Transforms
Vague	Water runs downhill, and but the rains fell.	
Specific	Water runs downhill, and but it is fresh.	
Most specific	Water runs downhill and but is fresh.	

A parallel transform which requires a "recoverable" (repeated) item in the K's.

Fresh water runs downhill.

An adjective transform; requires a *be* in one kernel.

Subordinating transforms establish the fact that one idea is less important than the other; three levels of definiteness are shown in these *embedded Transforms*.

Vague The rains fell; however water runs downhill.

Specific Since the rains fell, water runs downhill.

Running downhill, the water is fresh.

Water, which runs downhill, is fresh.

Most specific Water's running downhill is unusual.

For water to run downhill is unusual.

That water runs downhill is unusual.

Adverb modifier—
headless phrase

Adjective modifier—
partiple

headless phrase

Nominalization embedded transform—the one K fills a slot in the other—gerund, infinitive or clause.

My contention is that grammar in English sentences may show negations, questions, emphasis, co-ordination or subordination. These grammatical concepts are produced through transformations of basic sentence patterns; each transformation is recognizable, and students who are being taught to read well should recognize both the patterns and the concepts they convey so that these significant features may be added, along with the more usual units of semantics and syntax, in the efficient and speedy extraction of meaning from written communication—good reading.

Exercises to teach the skill can be made. Experiments which will test the usefulness of the technique can be devised. Both of these I shall have to leave to those of you who have student guinea pigs on whom to experiment.

Research in R.N.A. and D.N.A.

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The long-known scientific facts that life processes were contained in cells is centered for our current attention around the chemical fascination of the nucleic acids.

The biology of our theme is less than one hundred years old, but the molecular concept of learning and memory is very new. The seat of learning or environmental basis for explaining the mind and its functions is not consonant with the ever-increasing knowledge of molecular biology.

Pathfinders include Mendel of Austria, the geneticist, Cajal of Spain, the reporter on neural circuits at the turn of this century, and Pavlov of Russia. About this time, Americans W. Sutton and T. H. Morgan told about genes and chromosomes. A Frenchman, R. Semon, in 1904 said that a trace "engram" was left with each experience, and it was fifty years later that Penfield proved this true. He probed an exposed brain, and the patient recalled very minute instances of his childhood. In 1928, F. Griffith, an Englishman, showed that traits of one organism could be transferred to a different organism and that transfer was carried by other generations.

Until recently (around 1948-1950), there was no break-through. Then, somewhat simultaneously, several findings were made. Dr. Ward Halstead suggested that the engram might exist as a molecular change in the nucleic acids found within a single cell. A group at Rockefeller Institute showed that DNA was the carrier of gene substance. The Swedish biologist Dr. Holger Hyden in 1962 linked ribonucleic acid, RNA, with memory.

In one experiment, Dr. Hyden showed that qualitative changes were found in the nuclear RNA taken from trained rats. No qualitative change occurred in untrained rats. He also proved that during experience, RNA is in greater production and apparently changes somewhat as the experiences accumulate.

Two physicists and one biochemist, Francis Crick, H. F. Wilkins, and James D. Watson, figured out that DNA was a double-stranded helical complex which could reproduce itself. They received Nobel Prizes for their discovery.

Then followed a fascinating race in many laboratories for the biochemical basis of memory. Separate and independent teams injected yeast RNA into worms and rats and claimed improvement in learning. If RNA build-up was promoted, learning increased. Some of the experimenters included Pickett and Jennings on the influence

of RNA and victim training on maze learning by cannibal planarians (1); Cook and Davidson on the effects of Ribonucleic acid on the conditional behavior in rats (2); Goren on the influence of ribonucleic acid on the maze learning ability of rats (3); Ungar on the transfer of habituation by material extracted from the brain (4); and McConnell on the effects of regeneration upon the retention of a conditioned response in the planarian (5).

Dr. James V. McConnell trained flatworms to respond to light to 92% expectancy. These were then cut in small pieces, and the regenerates, when mature, were trained. These regenerates learned more quickly than the original planarians.

Other experiments also showed that worms maturing from regenerated tails learned quicker than the original. In these instances, retention of learning was passed along.

Dr. McConnell later attempted the cannibalistic transfer of learning with cannibal flatworms (1962). The flatworms which ate educated flatworms learned faster than other flatworms. These experiments have been replicated in many laboratories.

In 1961, M. W. Nirenberg established the first DNA code triplet with a specific amino acid. S. Ochoa of New York University has produced a single-phase RNA. And only two years ago, H. Khorana, a biochemist, synthesized chains of known bases of DNA up to the making of protein. Two Frenchmen, F. Jacob and J. Monod, worked out that DNA does the coding of the structure and regulates the genes, and the messenger RNA.

R. W. Corning and E. John tried this RNA hypothesis. First, they trained flatworms and then cut them in half to regenerate, some in pond water, some in weak, RNase, ribonuclease. The expected retention took place with head and tail regenerates, but those put in the RNase showed complete forgetting instead of retention, even though they could relearn.

In 1966, Dr. D. Albert of Canada showed that RNA and not protein was the chemical which effected the transfer of learning. Additional researchers who have made known their findings include A. L. Johnson and team, which moved into hamsters and later crossed species training from trained hamsters to naive rats.

Dr. Th. Nissen and E. Fjordingstad at Copenhagen showed that learning could be transferred chemically in, "Effect of RNA Extracted from the Brain of Trained Animals on Learning in Rats." (6)

An interesting experiment which was reported by Dr. McConnell a few months ago serves to introduce an assist made by Dr. Ungar. He said that the experimenter should measure his animals' behavior prior to using them. (7) The experiment called for training rats for several days, to a one-minute interval of a rising and lowering milk dipper or to respond to a click which elevated the dipper of milk.

When this was learned, a lever was added, and only when it was pressed would the milk dipper appear. This confused the rats until, in rambling, the lever was pressed which set off the click and the dipper was raised; the thirsty animals went to drink. Note that without the first-phase training, the rats would not have ordinarily learned the second phase—that pressing the lever was associated with the milk.

A group was given phase one training only, then RNA was extracted from their brains and injected into completely untrained animals; RNA was also extracted from the brains of untrained donors and injected into controlled animals. Each animal was then put through the second-phase training. The recipients of the educated donors would learn the second phase rather rapidly, and few from the untrained would learn at all.

Bear in mind that new biochemical concepts might open the way for different research, whose procedure or results project into other fields. To cite one result useful to educators or methodologists: planarians receiving conflicting instruction through injections learned much slower than other groups. In addition, they acted differently and refused the task. This outcome might mean, "teach one thing at a time and avoid two or more similar but different things."

Or, as implied earlier, new learning brings on chemical change. If the template for the engram is not properly experienced, the chemical code will be confused. One might abstract that rhythms and any alterations brought about by conditioning may tie in with information input. It may also be that interrupted non-flowing bits of learning may not take in an information system which is continuous. The learning theory now suggests a constant availability of memory with objective order; if this is so, where does the learner engram a new sequent? Can it get in?

Perhaps we can adapt to some of these classical experiments with some of our own. We may even attempt objectifying outcomes of instruction in ways other than testing for comprehension.

At present, the experimental evidence points to DNA and its four-based formation of chemical molecules as the possible storer of all genetic information. The model suggests two strands of the helical chain made up of phosphate bits . . . Adenine, which is joined by hydrogen only with Thymine, and Cytosine, which is joined only with Guanine. The information is passed on by these basic four in a variety of coded combinations via a three-word chain, which is the messenger known as RNA. Theoretically, this substance, ribonucleic acid, can encode 10^{13} bits of knowledge. The neural impulse to the cell informs it where to deposit the coded message.

As each strand reproduces into a new couplet, one of the chains serves as a messenger line. In this endless rebuilding, it should be

possible to have personal characteristics made to order. If one follows the messenger theory, it is speculatively conceivable that individuals neurally operate with psychic differences, some underactive, some normal, and some over-responding. It is further likely that within these, the response range would be highly selective and variable. There may be a message here for educational theory or method.

One would like to suggest especially to those who have done continuous work in effective reading over a long period of time that they have encountered these psychic differences in individuals. One would expect comparable achievement gains in rate, number of correct answers, and comprehension efficiency for similarly-endowed individuals. One does not get the expected results. It is quite possible that such examples may be scrutinized under the RNA banner.

Much remains to be established about neuronal coding: whether a storage system exists, how to decode, or whether this learning and memory is a continuous cycling of excitations as Ungar suggests.

The interest to us as possible recipients of culture transmission has no limit. That memory steps may be transferred by chemicals from a trained person to an untrained one seems possible. Much needs to be done and caution is warranted all along the way.

In consequence of these proved advances, we in education will have an operable and objective model to go by and not a theory. We can look for great changes in approaches to learning.

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Factor Analysis of Three Critical Thinking Tests, One Logical Reasoning Test, and One English Test

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INTRODUCTION

A venerable and enduring objective of American public education has been the enhancement of pupils' critical thinking. Critical reading has been another venerable and enduring educational objective.

Although critical reading has often been seen as similar or identical to critical thinking (Karin, 4; Russell, 6; Wolf, et al., 11) there has been little empirical examination of the interrelationship. Glaser (2) obtained a correlation of .769 between the Watson-Glaser Test of Critical Thinking and the Martin Reading Comprehension Test which he described as a test of critical reading.

There have been hundreds of critical thinking and or critical reading opinion, theoretical, and research articles (Harcourt, Brace and World, 3; Wolf and Ellinger, 9) and therefore a corresponding abundance of definitions. These definitions of critical thinking and critical reading range from one variable to a large number of variables. The consequence of this abundance of articles, definitions, and number of variables within definitions is that the definition of critical thinking and critical reading is unclear. Confirmation of the unclear definition of critical thinking is provided by Ennis (1); Penfold and Abou-Hatab (5); and Wolf, et al. (10).

The main empirical examination of the definition of critical thinking was conducted by Rust, et al. (8) and Rust (7). Rust, et al. (8) factor-analyzed a matrix of Pearson product moment correlations of 21 subtests from A Test on Principles of Critical Thinking Form F1.5; A Test of Critical Thinking Form G; and the Watson-Glaser Critical Thinking Appraisal Form Bm. Three factors were rotated and identified: general reasoning; logical reasoning (application of logical principles); and tentatively described semantics. In a follow-up study Rust (7) found four factors for each of three samples. None of the 12 factors was considered similar. These results are not consistent with the results of the Rust, et al. (8) study in which one general factor, one larger group factor, and a small group factor were identified.

PROBLEM

The main objective of this investigation was to attempt to determine the definition of critical thinking through correlational and factor analysis of subtest scores of three critical thinking tests: A Test

of Critical Thinking Form G (Form G), the Cornell Critical Thinking Test Form Z (Form Z), and the Watson-Glaser Critical Thinking Appraisal Form ZM (Form ZM); a logical reasoning test, Logical Reasoning Form A Part II (Form A); and an English test, the Cooperative English Tests: English Expression: Form 1B (Form 1B).

Additional objectives were to determine the relationships between critical thinking and logical reasoning, critical thinking and English ability, and logical reasoning and English ability.

The Logical Reasoning Test, and the English Test Form 1B were included specifically to investigate the logical discrimination and tentative semantics factors respectively, identified in the Rust, et al. (8) study.

It was anticipated that these analyses would provide phenotypic evidence of the interrelationships and factor structure of the different combinations of subtest scores from which genotypic inferences could be made about the definition of critical thinking, the relationships between critical thinking and logical reasoning, critical thinking and English ability, and logical reasoning and English ability.

PROCEDURE

The data in this study were collected in May, 1966 from students in a junior level educational psychology course at Wisconsin State University—Oshkosh.

Pearson product moment correlations were used in all analyses. Principal components factor analysis with ones in the diagonals was used. Kaiser Normalized Varimax rotation was used to rotate all factors with eigenvalues in excess of one.

Four factor analyses were conducted:

Factor analysis of a 20x20 matrix of intercorrelations of all subtests of all five tests.

Factor analysis of a 19x19 matrix of intercorrelations of all subtests except the Logical Reasoning subtest.

Factor analysis of an 18x18 matrix of intercorrelations of all subtests except the two English Form 1B subtests Effectiveness and Mechanics.

Factor analysis of a 17x17 matrix of intercorrelations of all critical thinking subtests only, excluding both the Logical Reasoning subtest and the two English Form 1B subtests Effectiveness and Mechanics.

The purpose of the systematic exclusion of the logical reasoning subtest and the English subtests was to use factor analysis to sort out the variance associated with the Logical Reasoning subtest, the English Form 1B subtests, their joint variance, and the joint variance of each with the critical thinking subtests. The 17x17 analysis from which the logical reasoning and the English subtests were excluded

Table 1
Ms, Means, Standard Deviations, and Subtests' Intercorrelations

		N	X	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	COOP Effectiveness	201	19.6816	3.9520																				
2.	Mechanics	201	31.3930	7.3614	.447																			
3.	Logical Reasoning	211	11.5308	4.6591	.052	.190																		
4.	Form G Pert. Inf.	195	5.8162	1.4420	.102	.152	-.010																	
5.	Val. Inf.	195	4.0103	1.9049	.320	.265	.015	.218																
6.	Problems	195	3.0000	1.1621	.178	.230	.025	.240	.312															
7.	Recog. Assump.	195	10.0564	3.0817	.410	.329	.087	.189	.341	.252														
8.	Hypotheses	195	8.6513	2.9968	.229	.213	.085	.221	.370	.312	.363													
9.	Form Z Conclusions	187	6.1064	1.6577	.137	.209	.148	.007	.156	.126	.257	.100												
10.	Fault Thinking	187	5.1551	1.7390	.243	.185	.139	.004	.270	.033	.306	.120	.219											
11.	Reliability	187	1.7487	1.1052	.211	.367	.079	.073	.244	.225	.288	.208	.215	.157										
12.	Data Interp.	187	8.8128	1.8146	.224	.175	.160	.067	.108	.110	.288	.210	.208	.301	.135									
13.	Predictions	187	1.8075	0.9921	.203	.130	.189	-.033	.191	.106	.075	.162	.261	.161	-.079	.010								
14.	Definitions	187	2.4171	0.8964	.114	.065	.000	-.091	.086	-.070	.156	-.043	.016	.120	.123	.081	.006							
15.	Assumptions	187	3.1925	1.4351	.038	.107	.138	.054	.098	.061	.144	.080	.218	.072	.109	.096	.083	-.092						
16.	Form ZM Inference	199	10.2161	2.7521	.182	.211	.073	.224	.170	.172	.302	.136	.108	.091	.061	.100	.129	.118	.073					
17.	Recog. Assump.	199	11.8894	2.4158	.123	.112	.120	-.079	.107	.178	.214	.192	.122	.176	.103	.079	.086	.126	-.075	.100				
18.	Deduction	199	17.7035	2.7224	.232	.181	.202	-.014	.393	.185	.323	.236	.164	.188	.301	.175	.156	.014	.202	.158	.086			
19.	Interpretation	199	17.1372	3.0625	.289	.333	.137	.092	.281	.136	.220	.179	.267	.335	.276	.183	.151	.095	.174	.182	.113	.314		
20.	Eval. Arg.	199	9.6935	2.4312	.060	.021	.020	-.008	.087	.062	.048	.022	.041	.158	.013	.031	.111	.076	-.115	.061	.089	.031	.112	

was then an analysis of critical thinking subtests only and substantially replicated the Rust, et al. (8) and Rust (7) studies.

RESULTS AND DISCUSSION

Because of limitations of space, three tables of the unrotated factor loadings and three tables of the rotated factor loadings for each of the 20x20, 19x19, and 18x18 analyses will not be included herein. These tables are available upon request.

Table I indicates the *N*s, means, standard deviations, and inter-correlations of the 20 subtests of the five tests.

The highest subtests' intercorrelation was .447 between Form 1B Effectiveness and Mechanics. There was one other correlation above .4 and seventeen correlations between .393 and .300 with the rest below .3. A correlation of .11 was significant at the .05 level.

Table 2 indicates the unrotated and rotated factor loadings, eigenvalues, and percents of variance for the six factors with eigenvalues greater than one for the 17x17 matrix of critical thinking subtests only, excluding both the Logical Reasoning and English Form 1B subtests.

The factor loadings and percents of variance accounted for by each factor, particularly the largest factor in the unrotated analysis, changed with rotation. It can be seen that the factors, generally similar from the unrotated analysis to the rotated analysis are I to I and VI, II to I, III to III, IV to IV, V to V, and VI somewhat to II.

Factor I, a group factor, was very similar to factors II in the 18x18 and I in the 19x19 analyses, and somewhat similar to factor II in the 20x20 analysis. It was defined as judgment about relevance of evidence. Factor II, a group factor, was similar to VII in the 20x20 analysis and VI in the 19x19 analysis and somewhat similar to VI in the 18x18 analysis and was defined as judgment of certainty about whether or not a conclusion follows. Factor III, a group factor, was similar to III in both the 20x20 and 19x19 analyses and was defined as recognition of assumptions. Factor IV, a near doublet, was consistent with IV in the other three analyses and was defined as judgment about the certainty with which predictions follow. Factor V, another doublet, was similar to V in the other three analyses and was defined as judgment of fine distinctions about the relation between given data and supposed inferences and conclusions. Factor VI, a group factor, was similar to I in the 20x20 and 18x18 analyses and was defined as judgment whether conclusions, implications, follow from evidence given.

The Logical Reasoning Test apparently pulled together the variance of Form Z Data Interpretation. Predictions, Conclusions, and Assumptions which in the absence of Logical Reasoning separated into two factors dominated respectively by Data Interpretation and Predictions. Form Z Data Interpretation and Predictions are both based

Table 2
Unrotated and Rotated Factor Loadings, Eigenvalues, and Percents of Variance for the 17x17 Matrix of Critical Thinking Subjects Only

	Factors	Unrotated						Rotated					
		I	II	III	IV	V	VI	I	II	III	IV	V	VI
Form G	Eigenvalues	3.540	1.483	1.309	1.213	1.067	1.003						
	Per. of Var.	20.825	8.723	7.701	7.137	6.277	5.899	10.095	10.616	7.845	7.976	7.997	12.031
	Pert Inf.	-.266	-.615	-.197	.030	.116	-.053	-.292	-.052	.132	-.112	.739	.034
	Val. Inf.	-.611	-.164	-.100	.101	-.167	-.279	-.391	.001	-.049	.195	.234	-.562
	Problems	-.178	-.409	-.225	.128	-.238	.113	-.681	-.016	.038	.052	.175	-.182
Form Z	Recog. Assump.	-.681	-.050	-.108	-.215	.143	.131	-.333	.493	-.085	-.072	.300	-.325
	Hypotheses	-.558	-.336	-.174	.066	-.210	.242	-.694	.165	.058	.027	.133	-.178
	Conclusions	-.465	.229	.381	.166	.081	.227	-.037	.521	.285	.318	-.061	-.202
	Fault Thinking	-.509	.431	.030	-.024	.119	.125	.010	.586	-.159	.235	.012	-.245
	Reliability	-.492	-.031	.088	-.461	-.308	-.231	-.183	.129	-.056	-.306	-.064	-.678
Form ZM	Data Interp.	-.429	.146	.097	-.283	.283	.487	-.114	.752	.055	-.149	.095	.011
	Predictions	-.308	.207	.092	.737	-.002	.017	-.127	.092	.122	.806	.001	-.042
	Definitions	-.151	.160	-.334	-.360	.201	-.279	.293	.221	-.612	-.098	.117	-.247
	Assumptions	-.274	-.151	.680	.019	.135	-.034	.131	.211	.643	.044	.095	-.308
	Inference	-.401	-.129	-.224	.096	.544	-.167	-.030	.187	-.125	.165	.687	-.098
	Recog. Assump.	-.326	.271	-.388	.000	-.325	.393	-.474	.336	-.395	.107	-.293	.016
	Deduction	-.577	-.001	.242	-.049	-.280	-.308	-.168	.075	.124	.106	-.028	-.711
	Interpretation	-.575	.221	.161	.017	.041	-.259	.028	.281	-.017	.250	.120	-.563
	Eval. Arg.	-.167	.311	-.368	.359	.035	-.231	.008	-.034	-.446	.502	.083	-.083

on content similar to that on which Valid Inferences IV was based. It is suggested that their overlap reflected this content rather than underlying similar or identical abilities. Valid Inferences IV was one of the subtests loading on the logical discrimination factor in the Rust, et al. (8) study. Therefore it was concluded that the Logical Reasoning Test represented near specific variance disparate from the variance associated with the Rust, et al. (8) logical discrimination factor.

Form 1B Effectiveness and Mechanics jointly influenced two factors to become weak group factors in both the 20x20 and 19x19 analyses in which Form 1B Effectiveness and Mechanics were included. One factor involved precision in the use and interpretation of the language of inference, implication, and conclusion. The second factor involved making discriminations about degree of truth or falsity, relevance, explicitness, correctness, and precision in language usage. A third factor was somewhat influenced by Form 1B Effectiveness. It was concluded that the Form 1B subtests controlled variance similar to that associated with the tentative semantics factor found by Rust, et al. (8).

The Logical Reasoning subtest correlated .052 with COOP Effectiveness and .190 with COOP Mechanics.

It was noted that interpretation of factors accounting for small percents of variance is tenuous.

CONCLUSIONS

It is concluded that critical thinking is not a general ability but a composite of several group factors including judgment about relevance of evidence; judgment of certainty about whether or not a conclusion follows; recognition of assumptions; judgment about the certainty with which predictions follow; judgment of fine distinctions of the relation between given data and supposed inferences and conclusions; and judgement whether conclusions, implications follow from evidence given.

The Logical Reasoning subtest appears to represent near specific variance disparate from the other measures.

Form 1B English variance overlapped considerably with critical thinking test variance, influencing three factors.

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Reading Interests of UNRWA Students in Lebanon

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INTRODUCTION AND PURPOSE OF STUDY

For more than a half-century, psychologists and reading specialists throughout the United States have manifested interest and concern in what children and youth read on their own as a sound basis for providing programs, materials, and educational experiences designed to develop avid readers and alert and well informed citizens.

In addition, numerous investigations of children's book interests have been undertaken in various other countries throughout the world. A review of the literature, however, failed to yield studies involving the free-reading preferences of Arab youths enrolled in the UNESCO-UNRWA program of education.

As a matter of background, the term UNRWA refers to United Nations Relief and Works Agency. It is a special agency of the United Nations assigned the task of giving "temporary" relief to the Arab refugees from Palestine in the Middle East, and also to the task of helping these refugees become self-sufficient. The educational program of UNRWA is an all-encompassing one, including a system of primary, preparatory, and vocational schools, and teacher training institutes. Nine years of free schooling are available, but not mandatory, for all Palestinian refugee children. These children, along with their families, are located in the Arab states of Syria, Jordan, and Lebanon, and in the Gaza Strip, formerly under the administration of the U.A.R., but presently occupied and administered by Israeli authorities. This study is concerned with the reading interests of UNRWA students in Lebanon with whom the present writer worked as a Teacher Education Specialist seconded from UNESCO.

It is a well-established fact that no matter where in the world children and youth grow up, many of them experience such pressures as illnesses, the unrooting from friends and a familiar neighborhood, war anxieties, separation from parents, and tensions in the home, to name a few. The UNRWA students in Lebanon are no exceptions. In fact, these students have had and continue to have their share of these and many other kinds of pressures heaped upon them as a result of two major wars and a series of on-going sporadic fighting incidents between their own people and the people of Israel.

Ciancolo (1) has expressed the view that the act of reading is one way in which children and youth can cope with their problems. That is, the story and picture materials of a book could very well provide the source of psychological relief for the individual. By selecting

books whose values they could understand and appreciate, or with which they could establish some real association, these so-called disadvantaged youths could keep their powder dry, so to speak, and meet head-on some of the problems they face, believing that there will come a better day. The purpose of this study, then, was to examine the reading interests of UNRWA students in Lebanon with the view that perhaps some insight could be gained about the quantity and quality of their preferences. A second purpose of the study was to present to administrators, teachers, and UNRWA education officials some evidence of the need for more individual and group counselling sessions, for providing additional materials, facilities, and time for their use.

PROCEDURE

A brief reading interest inventory consisting of ten questions was presented to more than 300 male students in preparatory classes in two UNRWA schools at Saida, Lebanon, and in the Siblin Teacher Training Institute nearby. The education and psychology teachers in the latter institution and the classroom teachers and principals assisted in the administration of the inventory. Chronological ages of the students in the preparatory schools ranged from thirteen to fourteen, while at the Teacher Training Institute ages ranged from nineteen to twenty-five. No intelligence tests have ever been administered to any of these students, nor is there one available at the present time for use with them.

RESULTS

Of primary concern to educators is the question: Do children and youth enjoy reading to the extent that they naturally and habitually turn to books when there is free time at school or at home? On examining the answer to the first question on the inventory: "Do you enjoy reading? If not, why not?" it was found that 100 per cent of the preparatory students answered in the affirmative. All except ten of the teacher trainees answered in the affirmative. The ten recording negative replies gave as their reasons: a) "I have no wish for reading," b) "The state of my life cannot be helped by reading," c) "My mind is troubled, and I cannot read," d) "My first teacher does not care if I understand anything or not." These replies are possibly indicative of the present political, social, and economic state of affairs of the Arab-Israeli conflict.

Question No. 2 concerned the amount of time spent in free reading. This question was prompted because of the observed disdain for newspaper and magazine reading by the students on the part of certain school and UNRWA officials. There was constant criticism of this activity, and teachers were advised to see to it that the students read only that which pertained to their course work during library hours. (This was almost an impossibility inasmuch as a teacher moving

in and among students at crowded library tables would be interrupting and distracting as well as downright annoying. Furthermore, how would anyone know if a student had completed his assignments or not?) This was at the Teacher Training level, not at the preparatory level for there were no libraries.

In answering this question, however, the amount of time shown by the preparatory students was from one-half hour to three hours daily, while that of the teacher trainees ranged from none to five hours daily. This could very well be the case inasmuch as there was practically nothing else for students to do. There were no work-aids students and very little attractions in the local town.

The attitude of the teacher is crucial in developing permanent reading interests, but Painter (5) emphasizes that the school can make little headway if the home is reinforcing inappropriate attitudes and habits with reference to reading. Because they had fled from their homes in their early years, it was felt by this writer that the economic and social conditions of the youth at the preparatory levels, like those of many of their disadvantaged American counter-parts would produce bitterness and negative attitudes toward reading. On the contrary, these students, without exception, answered "Yes" to Question No. 3, "Do your parents encourage you to read?" Here was an example of parents' sensing the value of reading, no matter what.

Admittedly, of course, this was not a timely question for teacher trainees. First, because they were all in boarding school and had little, if any, contact with their parents. Perhaps more important was the fact that "Alas," as several of them answered, "I no longer have any parents," meaning, as it were, that they had been killed in the June, 1967, war. A goodly number of these students, however, answered the question in the affirmative, although a substantial number replied in the negative. This latter vein could best be attributed to the on-the-spot bitterness and indifference to the enemy that occupied and controlled the land that was their home rather than to a neglect to admonish their sons to read widely. Seeing the enemy on one's soil every day is somewhat different and evokes greater animosity than does just hearing about his being there.

Question No. 4 asked students to list some of the books that they had read during the past six months. As shown in the following Tables, a surprisingly large number of books was listed in each of the four school levels. Only books listed three or more times are recorded in each of the Tables, combined for Preparatory students and also for Teacher Trainees.

On the Non-Fiction side, the political and religious motives prevailed in the reading of preparatory students, while stories with a moral received the greatest attention among the Fiction. Table 2 shows that the trainees preferred politics, history, and romance.

TABLE 1
BOOKS READ DURING THE PAST SIX MONTHS
by Preparatory Students

Fiction	Non-Fiction
Broken Wings	The Prophet
Robinhood	Palestine Is Our Land
The Tree of Misery	The Heart of Lebanon
A Tear and A Smile	Zionism and Imperialism
1001 Nights	Mohammad and the Caliphes
The Great Escape	King Hussain
The Lost Boys	The Road to Freedom
Les Miserables	Palestine Liberation
The Monkey and the Tortoise	Ancient Egypt
The Mother	The Kingdom of Jerusalem
Robinson Crusoe	How to Return to Palestine
Kalilah and Dimnah	The Commandos' Story
Superman	My Life (Hitler)
Bat Man	How to Know Yourself
The Black Arrow	Madame Curie
David Copperfield	Shahnameh (Book of Kings)
The Poor	The Land
The Greedy	Castro and Cuba
The Sun Will Rise Again	The American Revolution
The Bird Parliament	The Arab Society
Tarzan	The Hero, Che Guivara
Book of Fairy Tales	The Book of Mirdad (Biography)
Tale of Two Cities	The Battle of One Destiny
Treasure Island	Landmarks of the New Arab Life
Arab Mythology	In the Shade of the Koran
Ali Baba and the Thieves	The Crescent in Crisis
The Bread Seller	
The Vagrant Soul (Memoirs of)	

No lines were drawn through any of the books listed by the students, thus indicating that the reading of all books had been completed, as suggested in Question No. 5.

None of the students in the preparatory classes replied "Yes" to the question inquiring about library cards. (It should be mentioned here that there is practically no contact by UNRWA students with the outside community, because, as aptly pointed out by Hirschman (2:63), "this international body (UNRWA) has cooperated with the Arab governments, who kept the refugees virtually imprisoned in "temporary" camps. . . ." On the other hand, many of the teacher trainees answered in the affirmative, adding however, that their public library cards were in Amman, Jerusalem, or elsewhere.

Replies to Question No. 7, "How many books do you own?" ranged from none to 25 for the preparatory students, while those of the trainees ranged from none to 250. Those who listed more than 25 books added that their books were left in Jordan, Jerusalem, etc.

The 10 students who exhibited a negative attitude toward reading were consistent throughout the inventory. Their answers to Question No. 8, "What Books Would You Like to Own?" all were alike: None.

TABLE 2
BOOKS READ DURING THE PAST SIX MONTHS
 by Teacher Trainees

Fiction	Non-Fiction
The Dove's Necklace	East (Magazine)
Seven Beauties	Political History of the Arabs
Bride of Fargana	The Arabs and Imperialism
The Good Earth	Arab Socialism
Jane Eyre	History of Arab Wars
Mill on the Floss	The Philosophy of Islam
The Women of Memphis	Group Solidarity
Star-Crossed Lovers	The Arabic Administration
King Lear	Palestine Problems
Women in White	Khalil, Pupil of the Revolutionist
Vinisa Lovers	How to Enjoy Your Marriage
The Rubaiyyat	World War II
Ten Odes	How to Be a Good Teacher
Journey to the Center of the Earth	Memoirs of a Conqueror
The Old Man and the Sea	Fields of Arabic Thought
Macbeth	Guerilla War
The Rebellious Souls	Al Qu'ran
	Ana Ahya: The Arabs Revolt From Parents

Others, however, indicated a desire for books relating to science, English grammar, health and physical education, sports, and religion.

Question No. 9 was "How many books are in your home?" The preparatory students recorded numbers from none to 115, while the trainees listed none to 400, and again, most of the latter's books were left in Jordan or elsewhere.

Interest areas were called for in Question No. 10. They are represented for each level in Table 3. As can be seen, the political area dominates at all grade levels. This is also evident in the activities of the UNRWA students. The birthdate of any Arab leader, living or dead, as well as any political incident is an occasion for UNRWA students to be out of classes, parading the streets, hoisting a picture of Nasser and shouting "Down with Israel, Down with Imperialism."

Among the few books seen in the Teacher Training Institute library and in the classrooms, most are paperbacks. Little, if any, contact is made with the opposite sex. However, romance and marriage was a topic for interest of 14 students at the higher levels. Both biography and psychology (How to Know Yourself) received the same amount of interest at the higher levels, while mystery, detective stories, adventure, travel, and fairy tales were well received by the first preparatory group. How to Know Yourself was perhaps the closest to the so-called career books for the preparatory group. It should be also noted that non-fiction dominated at the upper levels, probably because more pressures were being felt in areas such as politics and family responsi-

TABLE 3
INTEREST AREAS: BOOKS ENJOYED MOST

Areas	1st Prep.	2nd Prep.	1st TT	2nd TT	Total
Adventure & Travel	6	8	4	4	22
Art	4	3	3	2	12
Biography	8	5	8	6	27
Detective	8	0	2	1	11
Essays	7	3	5	0	15
Fairy Tales	5	1	0	0	6
History	11	7	12	13	43
Music	0	1	0	3	4
Mystery	9	0	0	0	9
Plays	2	2	2	6	12
Poetry	4	5	2	1	12
Political	11	15	39	31	96
Psychology	1	3	8	6	18
Religious	8	2	8	9	27
Romance & Marriage	0	0	6	8	14
Science	3	5	8	7	23
None	0	0	5	5	10
Total	90	60	112	102	364

bilities. Furthermore, they were in their last phases of teacher preparation prior to leaving the Institute for work.

As shown in Tables 1 and 2, the reading interests of these UNRWA students involve poems, short stories, and treatises with themes ranging from the sad and cynical to the fiercely patriotic. Further, their preferences included long epic poems and stories extolling the virtues of heroes and kings, and of nationalism. Involved in the latter theme is much work concerning the people and their lives, the individual, his liberty, and his free choice, written also, of course, in the vein of the socialists' doctrine (for example, *The Land*, *The Crescent In Crisis*, *Landmarks of the New Arabic Life*, *Palestine Problems*, and *The East*, a Communist magazine). It should be pointed out, however, that the book, *Ana Ahya*, portraying the Arabs' revolt from their parents, received a noticeably large number of listings by the students at the upper level. This is understandable in view of the severe restrictions of the Arab family life.

Hottinger (3:334) reported that the writings of the so-called contemporary Arab intellectuals are said to be somewhat incoherent and under the influence of anxiety (Oalaq), and adds that "In the case of the modern Arab intellectuals, it is the unrest and the anxiety which have been caused by the destruction of the firm bonds of Islamic life."

These UNRWA students seem to have one thought uppermost in their minds, that is, that the Arab refugees must return to Palestine.

This is reflected not only in their reading interests, but also in their everyday expressions.

SUMMARY AND CONCLUSIONS

Table 3 reveals that books on politics dominated all others with 27 per cent of the total. History books came next with 11.8 per cent of the total, followed by biography (usually of army notables like Castro, Che Guevara, and Khalil) and religion each with 8 per cent of the vote. Of least interest to the students was literature concerned with the topics of magic, mystery, and fairy tales. Their preferences were exemplified in books which seem to hold a promise of a better life for them, and understandably so.

The overcrowding and conditions of squalor within the tents and mud huts wherein the preparatory students live are by no means conducive to studying or to recreational reading, although much is said to be done there. Studies reviewed by Mersand (4), Ciancolo (1), and Painter (5) indicate that American students presently reading more books and have better taste in books than their predecessors. The one librarian at the Teachers Training Institute of Sibirin serves both that institution and the Technical School located on the same campuses but housed in different buildings. Thus, for one-half day, the library is not in use at either place. There are no libraries in the two preparatory schools in the study, and at the time of the inventory, no record was kept of the number and types of books being read by either group.

In the absence of this and previous studies of the reading interests of these students in UNRWA, it is impossible to say if the interests recorded in the present study represent an improvement in amount and taste over their earlier reading habits. The important thing is that the majority of these students have the reading habit. They express themselves well, and are alert to the fact that reading puts the world at one's finger tips.

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A Second Report on the Phonics Skills of Teachers and Teacher Education Students

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In a previous review of the phonics knowledge of teacher education students by Ilika (17), it was noted that sex differences in phonics knowledge were not reported in the investigations by Aaron (2), Broman (5), Farineffa (13), Gagon (14), (15), Ramsey (22), Schubert (26), Spache and Baggett (29). Cottrell reported significant differences in phonics knowledge in favor of college females who also had less variability in their scores than males (8:1271). At the elementary school level, the author of the *McCullough Word-Analysis Test* reported that "Most significant is the persistence of the girls' higher scores. Because of this observed sex difference, separate normative data are given for boys," (19:3-4).

Brown and Cottrell state that in the ninety-item prototype of the *California Phonics Survey* "A statistically significant difference (at the .07 level) was found between scores earned by men (N=963) and by women (N= 689) in the relationship of phonics to reading, with the men showing slightly higher correlation (.70 vs. .63)," (6:8).

The authors of the C.P.S. also note that "Phonics adequacy is an important component of scholastic aptitude and intelligence as measured by standardized group tests," (6:14). Such a relationship was also reported by Triggs who noted that the Roger Phonics Test correlated (.44 and .47) with the verbal portion of the Thurstone Test (31:200).

The relationship of phonics knowledge to sex differences is not firmly established. Reference to the fact that phonics knowledge tends to have some positive correlation with verbal factors justifies a brief look at the recent report of Tyler on *The Psychology of Human Differences* and Maccoby on *The Development of Sex Differences*.

Tyler stated that "When we consider the evidence that girls learn to talk a little earlier (Goodenough, 1922), are somewhat superior during the preschool years in articulation, intelligibility, and correctness of speech sounds (Wellman, et al., 1931), learn grammar and spelling more readily . . . we see it all supports the generalization that girls are verbally more fluent from infancy on," (32:244). Maccoby is in agreement with Tyler on the existence of verbal sex differences in the early portion of life (18:26).

Adding to the indecisive nature of the survival of superior verbal differences is the exhaustive work of David G. Ryans' *Characteristics of Teachers*. Ryans found significant differences in "verbal under-

standing" favoring females at the secondary school level but not at the elementary level (24:297, 391).

THE PROBLEM

On the basis of existing related research regarding phonic skills, verbal fluency, and verbal ability, it appears that very little information is available to indicate whether male or female teachers have advantages in phonics knowledge. Therefore, the major problem of this investigation is to determine whether women are superior to men in phonics knowledge, as they seem to be superior to men in verbal fluency (32:244). Such an investigation would shed light on the psychology of reading methodology as well as on the subject of individual sex differences in human abilities.

From a practical point of view, the findings have implications for teachers and administrative leadership preparation in that 67 percent of the elementary school teachers are women, in contrast to the 90 percent of the principals who are men (30:5).

In addition, phonics knowledge comparisons between Lamar Tech, Texas, teachers and West Coast teachers as represented by an Oregon State University group of elementary education major graduate students will be brought up to date. Reference will also be made to differences in phonics knowledge of teachers who were more mature than the undergraduate students at the time of testing with the Aaron Phonics Test.

HYPOTHESES

On the basis of the preceding review and presentation of the problem, the following hypotheses are stated: There are no significant differences in Aaron's Phonics Test mean scores by the following groups:

1. Undergraduate elementary education males and females.
2. Graduate males and females.
3. Lamar Tech graduate males and females as compared to undergraduate males and females.
4. Oregon State University elementary education graduate students and Lamar Tech elementary education graduate students.
5. Oregon State University elementary education graduate students as compared to secondary and all other O.S.U. graduate students.

THE SUBJECTS

The Aaron Phonics Test scores of 198 graduate students at Oregon State University were available for analysis and comparisons. Of the preceding group, 96 student records were available to designate that there were 62 males and 34 females. The scores of 10 elementary majors have been identified for special comparisons. It should be noted also that a previous estimate of the total 198 students tested showed 30 percent of the students to be elementary majors, 50 percent to be secondary majors, and 20 percent to be other students (17:51).

The 114 graduate students of Lamar Tech were also active teachers of whom 10 were men. The small portion of men in this group is explained in part by the comment in the Texas Education Agency's *Report on Teacher Supply and Demand in Texas*, which states that, "only 13 percent of the elementary teachers, but 48 percent of the secondary teachers, were men" (30:5).

The undergraduate subjects included 378 undergraduates of whom all but 20 were from Lamar Tech. This small group of twenty students from the midwest contained three men who were needed to increase the representation of men.

The small proportion of men, 7 percent in this group, bears a relationship similar to the 10.5 percent proportion of men who received college degrees and preparation to teach in the elementary schools (21:20). Men in elementary teaching are in the minority.

THE TEST

The Aaron Phonics Test (2) was designed to test teacher phonics knowledge of principles having to do with words containing soft and hard *c* and *g*, vowel sound modified by *r*, open and closed syllables, short words ending in *e*, vowel *a* followed by *l*, vowel digraphs, and indeterminate vowels. The preceding generalizations have been commonly taught in elementary school reading programs and may be found in the teachers' manuals of basal series (2).

A test reliability coefficient of .98 was obtained by Aaron (2:321).

PROCEDURES

The procedures used in this investigation were to analyze a pool of Aaron Phonics Test scores which have been accumulated by the writer since 1962. The pool of data was grouped and re-grouped to test the previously stated hypotheses. Tests for significant differences between the means and tests for the analysis of variance by the application of the F-ratio test to the variances provide the basic statistical procedures (9), (34).

THE RESULTS

Comparison of Women and Men with Aaron's Phonics Test Means and Variances—Table 1 shows that the women in three separate groups and collectively had higher mean phonics test scores than the men. The differences between these mean scores were statistically significant at the .01 level of confidence with the exception of the undergraduate difference which was statistically significant at the .05 level.

Comparison of Lamar Graduate and Undergraduate Men and Women with Aaron's Phonics Test Means and Variances—Table 2 reveals that there were no significant differences between graduate and undergraduate men. The difference between the graduate women and undergraduate women was statistically significant at the .01 level and favored the more mature graduate women. The statistically significant

F-ratio suggests that factors other than chance may account for the difference.

Comparison of Lamar and O.S.U. Graduate Elementary Majors with Aaron's Phonics Test Means and Variances—Table 3 reveals that there is a statistically significant difference at the .001 level favoring the O.S.U. elementary majors. The F-ratio is statistically significant also at the .01 level. Again, factors other than chance may account for the gross difference.

Comparison of O.S.U. Elementary Majors and O.S.U. Other Majors with Aaron's Phonics Test Means and Variances—Table 4 shows that the elementary majors' scores were considerably higher than the scores of the secondary group and the miscellaneous group of students. The difference favoring the elementary majors was statistically significant at the .01 level. The F-ratio was not significant.

DISCUSSION OF THE RESULTS

In Table 1 the consistently superior performance of the women in sub-groups and in all groups on the Aaron Phonics Test is sufficient reason to reject the null hypothesis that there are no significant differences in phonics knowledge among the male and female teachers.

The findings are consistent with Brown and Cottrell's observation that college women had significantly higher mean phonics scores than college men (6), (8). The findings also parallel McCullough and Tyler in that females start with advantages and tend to retain their advantage in phonics fluency. It is important to note that the advantages enjoyed by the women exist at the undergraduate level where the influence of methods courses and teaching experience is negligible.

Whether or not the preceding finding has practical significance remains to be determined by further investigation. It should be noted, however, that this is not the first time the men have lost the verbal

TABLE 1
COMPARISON OF WOMEN AND MEN
WITH
AARON'S PHONICS TEST MEANS AND VARIANCES

Group	N	Men		Women			D	S.E.-	Z	df	F	
		m	S.D.	N	m	S.D.						
Under-graduates	353	36.44	6.92	25	33.52	6.93	2.92	1.43	2.01*	21	352	1.04
O.S.U. Graduates	31	41.53	5.85	62	37.68	6.68	3.85	1.31	2.93**	33	62	1.30
Lamar Tech. Graduates	104	43.49	9.19	10	32.50	9.48	10.99	3.13	3.51**	9	104	1.17
All Groups	491	38.29	7.615	97	36.07	4.04	2.21	2.21	2.78**	190	97	1.16

*Statistically significant at the .05 level.

**Statistically significant at the .01 level.

battle. In Millsap's doctoral dissertation, the principals and superintendents, indubitably male, were the lowest in recognizing the frustrational level of oral reading (20), (33). On the other hand, the classroom teachers, who were mostly females, were most successful in recognizing the frustrational reading levels!

The preceding findings have some implications for administrative leadership preparation, if instructional leadership is to be considered a serious role of administration.

In Table 2 the lack of significant differences between graduate and undergraduate men is reason to accept the null hypothesis that there are no significant differences among them. The reason why there are no significant differences may be explained by the fact that the elementary graduate male majors in this sample were probably employed as departmentalized teachers in the upper grades of the elementary school. Therefore, the men may have lacked the opportunity to learn and to apply, as is characteristic of female teachers who are constantly preparing and teaching reading lessons.

Coincidentally, this observation provides arguments to buttress the team-teaching proponents' plans which capitalize on the strengths of teachers. Thus, women would team teach in the language arts and men would team teach in math, science, and social science.

The second comparison in Table 2 reveals that the difference between means of graduate and undergraduate women is highly significant and is sufficient to reject the null hypothesis. The significant *F*-ratio in the undergraduate and graduate female comparisons reflects the characteristic immaturity of the undergraduates at the beginning of reading methods courses. The graduate women reflect the beneficial influence of teaching experience as Spache and Baggett have noted previously (29:97).

The statistically significant differences in Table 3, favoring O.S.U. West Coast teachers over Lamar Tech, is sufficient to reject the null hypothesis that there are no significant differences in the mean scores and the variances of the two groups. The highly significant *F*-ratio suggests that factors other than chance operated to cause such differences.

TABLE 2
COMPARISON OF LAMAR GRADUATE AND UNDERGRADUATE
MEN AND WOMEN WITH
AARON'S PHONICS TEST MEANS AND VARIANCES

Group	Graduates			Undergraduates			D	S.E.	Z	df	F
	N	m	S.D.	N	m	S.D.					
Males	10	32.5	9.48	25	33.52	6.93	-1.02	1.02	0.30	9/25	1.96
Females	104	43.19	9.19	353	36.41	6.92	7.05	0.92	7.31**	103/353	1.77**

**Statistically significant at the .01 level.

TABLE 3
COMPARISON OF LAMAR AND O.S.U.
GRADUATE ELEMENTARY MAJORS WITH
AARON'S PHONICS TEST MEANS AND VARIANCES

Lamar			O.S.U.			D	S.E.	Z	df	F
N	m	S.D.	N	m	S.D.					
111	42.25	9.7	10	48.40	3.33	-4.21	5.85	7.70	113/10	7.70**

**Statistically significant at the .01 level.

Among the factors which may have influenced such gross differences in variances are samples which reflect admission policies, minority group representation, dialect, socio-economic factors, and sample size. The larger variances of the Lamar Tech group are probably more indicative of the true total teacher population variance. The wide spread of variances demonstrates the dramatic existence of individual differences in teachers (2). The influence of such differing abilities on teacher preference for teaching methods is not known but certainly should be investigated.

The statistically significant difference in Table 4 between O.S.U. elementary majors and other O.S.U. majors is sufficient reason to reject the null hypothesis. This finding can be explained, in part, on the ground that the elementary majors were compared with deviant group normally not expected to teach phonics. Thus, Spache and Baggett noted that, "If a large proportion of our secondary teachers were science, mathematics, business education teachers, or the like, they might well be expected to be less familiar with phonics principles." (29:98). Their explanation also applies to the present findings. But the fact that the O.S.U. other majors attained scores as high as they did may be explained by Brown and Cottrell: "Phonics adequacy is an important component of scholastic aptitude and intelligence as measured by standardized group tests," (6:11). An investigation of the relationship of existent phonics tests with such "components," as mentioned, should determine whether phonics tests test phonics or intelligence!

TABLE 4
COMPARISON OF O.S.U. ELEMENTARY MAJORS AND
O.S.U. OTHER MAJORS WITH
AARON'S PHONICS TEST MEANS AND VARIANCES

Elementary Majors			Other			D	S.E.	Z	df	F
N	m	S.D.	N	m	S.D.					
10	48.10	3.33	28	37.14	5.46	10.96	1.48	7.43**	27/10	2.69

**Statistically significant at the .01 level.

FINDINGS

1. Undergraduate women and women teachers tend to know more phonics generalizations than men.
2. Experience in teaching reading and phonics skills reinforces female superiority and extends their superiority in phonics knowledge and skills.
3. Teachers and students have wide differences in phonics knowledge.
4. Elementary majors on the West Coast, as represented by a highly select O.S.U. small sample, enjoy significantly higher Aaron Phonics Test scores than all previously and presently reported groups.

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Readability Levels of Adult Magazine Material

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The importance of popular magazines as adult reading fare in America can hardly be contested. The current *World Almanac** lists seventy-nine titles with over a half-million circulation, fifty-two with over a million, twelve that pass the five-million mark, and two, *TV Guide* and *The Reader's Digest*, with over ten million paid sales each. Since most individual copies pass ultimately through the hands of more than one person, the total readership implicit in these figures is immense. From an estimated 250,000 magazine purchasers at the turn of the century, the number of households now reached has risen to beyond 40,000,000—80 per cent of the U. S. total (18).

And as readership has broadened, so has content. Nationally recognized scholars now edit monthly columns, and public figures regularly contribute sociological and philosophical articles in depth. So commonplace, in fact, has this sort of fare become that at least one popular magazine, *Playboy*, is now considered the focal point and fountainhead of a true "philosophy."

Certainly this new stature of the popular magazine in America demands the continuing concern of the theoretician or methodologist of adult reading. Instructional programs designed to develop adaptive, flexible readers must include provisions for the teaching of effective magazine reading; and this means that the new style, format, and content of popular magazines must be understood. As a step towards this, a new look at their readability levels is an appropriate beginning.

BACKGROUND

Actually, the measurement of difficulty-levels in magazine content has figured into readability research since the very beginnings of the science. H. D. Kitson, (21) in an early study considered by many to be the pioneer work in the field, compared word size and sentence length in the "lowbrow" (his terms) *American* magazine and the "highbrow" *Century*, finding both to be greater in the latter. Interestingly enough, even though Kitson never actually formularized his two indices of difficulty, they remain even today the two major inputs of several popular formulas.

Since that time, particularly following the publication of Flesch's Reading Ease formula (9), a good many other researchers have sampled magazine material. Wearne (24), Rancey (20), England (6), and

* 1968 Edition, reporting average monthly sales for the six months preceding January 1, 1967.

Knauff (16) all examined "house" and employee magazine copy in terms of readability, while Alden (1), Burton and Swanson (3), and Trenchard and Crissy (22) measured the difficulty of advertising matter in magazines. Cowing (4) studied farm journals, and Strang (21), Van de Water (23), and Lieberman (17) analyzed educational reports and magazines.

In 1951 Farr, Jenkins and Paterson (7) revised the input factors of Flesch's early formulas, thus generating a series of conflicting articles in the literature (11, 15, 8); and in 1958 Powers, Sumner, and Kearl (19) recalculated the Flesch, Dale-Chall (5), Farr-Jenkins-Paterson (7), and Gunning (13) formulas. Within all these studies, magazine materials figured prominently, with relatively low difficulty-levels reported consistently.

Most of this work, however, reflected the "old look" in popular magazines. By 1957 a study of several popular magazines (2) reported a median reading level of 10.8, and this upward trend has apparently continued. Instead of a mere handful of "quality" magazines, we now see articles of near-scholarly interest appearing in *Life*, *Look*, and the like. In recognition of this perceived trend, then, the following study was done:

METHOD

Selection of the Materials. From within the 100 top-selling magazine titles listed in the *World Almanac*, five each were chosen as representative of the following three categories: women's magazines, men's magazines, and general interest or family magazines. Assignment of each title to its category was based upon a combination of (a) its editorially stated target audience (if one was so stated), (b) the market guides submitted by the magazine to writers' trade journals, and (c) a personal examination and evaluation of its content and format.

Chosen as representative of women's magazines were *Cosmopolitan*, *McCall's*, *Redbook*, *Good Housekeeping*, and *The Ladies' Home Journal*. These titles cover target audiences ranging from the young, single career-woman to the young mother and the mature homemaker.

Chosen as representative of men's magazines were *Playboy*, *True*, *Sports Afield*, *Sports Illustrated*, and *Esquire*. These titles range in intended appeal from the young, college-educated bachelor to the mature "outdoor" type and the mature "sophisticate."

Chosen as general interest or family magazines were *Reader's Digest*, *Look*, *Life*, *The Saturday Evening Post*, and *TV Guide*. These titles are all from within the top ten in national circulation, but are not slanted primarily towards either sex.

Sampling of the Content. The lead "serious" (i.e., nonfiction, and not of a satirical or humorous nature) article of the earliest October, 1968, issue of each magazine was selected. Beginning at the first terminal punctuation after the 100th, 300th, 500th, 700th, and 900th words,

TABLE 1
READABILITY LEVELS OF SELECTED MEN'S, WOMEN'S, AND GENERAL INTEREST MAGAZINES

FORMULAS	Flesch Reading Ease		Farr-Jenkins-Paterson Revision		Gunning Fog Index	Fry Readability Graph	
Men's Magazines							
Playboy	28.5 College Grad.	(17th)	25.9 College Grad.	(17th)	15.7	College	(11.0)
Esquire	41.1 College	(14th)	33.6 College Grad.	(16th)	15.2	12th Grade	(12.2)
True	31.6 High School	(12th)	44.8 College	(14th)	19.6	9th Grade	(9.9)
Sports Afield	55.8 High School	(11th)	52.1 High School	(12th)	10.7	10th Grade	(10.1)
Sports Illustrated	63.4 8th and 9th Grade	(9th)	60.4 High School	(10th)	8.1	8th Grade	(8.3)
Average by Type	48.1 College	(13th)	43.4 College	(14th)	12.3	10th Grade	(10.9)
Women's Magazines							
Journal	43.4 College	(14th)	33.0 College	(16th)	11.1	11th Grade	(11.8)
Good Housekeeping	44.6 College	(14th)	45.9 College	(13th)	13.6	11th Grade	(11.3)
Cosmopolitan	56.9 High School	(11th)	55.0 High School	(11th)	12.2	10th Grade	(10.0)
McCall's	57.2 High School	(11th)	52.1 High School	(12th)	10.0	10th Grade	(10.4)
Redbook	56.9 High School	(11th)	53.3 High School	(12th)	11.6	9th Grade	(9.8)
Average by Type	52.8 High School	(12th)	47.9 College	(13th)	11.8	10th Grade	(10.7)
General Interest Magazines							
TV Guide	37.9 College	(15th)	27.6 College Grad.	(17th)	14.7	11th Grade	(11.5)
Reader's Digest	43.7 College	(14th)	39.7 College	(15th)	13.1	College	(13.0)
Life	45.6 College	(13th)	41.3 College	(14th)	13.4	12th Grade	(12.4)
Post	51.6 High School	(12th)	46.4 College	(13th)	11.1	10th Grade	(10.3)
Look	55.0 High School	(11th)	56.7 High School	(11th)	10.2	8th Grade	(8.8)
Average by Type	46.8 College	(13th)	42.9 College	(14th)	12.6	11th Grade	(11.2)
Average for All Types	49.2 College	(13th)	44.7 College	(14th)	12.2	10th Grade	(10.9)

Note—Figures in Parentheses are Interpolated and Extrapolated Sub-Levels.

five samples of 100 words each (plus the remainder of the final sentence) were taken and pooled. This procedure was intended to guard against atypical introductory sections.

The Readability Measures Employed. Each total sample was measured by four readability formulas: The Flesch Reading Ease Formula (10), the Farr-Jenkins-Paterson Revision of Flesch (7), The Gunning "Fog" Index (13), and The Fry Readability Graph (12). Table 1 reports the readability levels found for each magazine. The figures in parentheses are interpolated and extrapolated sub-levels.

Also, intercorrelations between the grade-level scores rendered by the four formulas were calculated. These are reported in Table 2.

RESULTS AND DISCUSSION

The results of this study indicate that contemporary popular magazine material is in fact often of a relatively high readability level. Though overall content may perhaps be lower, "lead" articles, at least, appear to be directed towards the reader with at least upper high school or college-level reading ability. This would suggest that such material can quite properly be included within the content of secondary and college-adult reading programs.

In addition, it appears that these four major adult-level readability formulas rank material on an easy-to-difficult continuum about equally well. This particularly speaks well for the Fry Graph, a relative newcomer on the readability scene.

In terms of actual grade-level placements, the two "younger" formulas (and in particular the Fry) appear to render somewhat lower ratings. Perhaps this is simply because general reading-levels have risen over the years.

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TABLE 2
INTERCORRELATIONS BETWEEN READABILITY GRADE-LEVELS

FORMULAS	Farr-Jenkins-Paterson	Gunning Fog Index	Fry Readability Graph
Flesch	.896**	.813**	.955**
Farr-Jenkins-Paterson		.810**	.742*
Gunning Fog Index			.731*

* $p < .01$

** $p < .001$

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Dyslexia-Single or Plural

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Dyslexia has been defined as defective reading. (1, p. 9) It has also been used to define the individual who is unable to learn to read adequately even though there are no capacity limitations, no evidence of brain damage, intact senses, educational opportunity, normal motivation, and no disruptive emotional interference. This is, of course, a negative definition; it tells us what dyslexia is not, it does not tell us what it is. In this construction, the term dyslexia actually implies an idiopathic condition where the symptoms are clear, but the cause is unknown.

In the last analysis, we really do not know what constitutes this mysterious entity dyslexia. Numerous terms have cropped up such as minimal brain damage, minimal cerebral dysfunction, strephosymbolia, etc. There is unquestionably a great deal of confusion surrounding the whole concept of dyslexia. The purpose of this paper is to clarify some of the issues related to this phenomenon and to offer a theoretical rationale for this most severe reading disability. The major assumption offered here is that there is *not* just one form of dyslexia, but three different types of severe reading disorders which *could* be labeled dyslexia. These types will be discussed in terms of their etiology, and their psychological and educational characteristics.

EGO DISTURBANCES CAUSED BY EARLY BRAIN DAMAGE

The first type consists of those youngsters who have experienced actual early brain damage, either prenatally, perinatally, or shortly after birth. When a child has suffered this kind of damage, it means simply that he is born with a defect in the very matrix of the crucial organ of learning, the brain, and its sensory and motor systems. This defect in the central nervous system makes it extremely difficult for the child to develop, at the time that he should develop, the primary apparatuses which will allow him to adjust to and learn in his environment. I am referring to such basic skills as perception, concept formation, and language. If he is also experiencing some problem in motility, then he will not have the feeling of being able to move, explore, and contact the world around him. To the average child, the ability to move around freely and comfortably, to touch things, to manipulate, provides a sense of mastery, a sense of self-esteem. This type of youngster instead acquires a sense of being someone who "cannot" rather than someone who "can." The most significant and all pervading psychological quality of these youngsters is the intense feeling of

defectiveness, the feeling of being someone who disappoints, rather than someone who succeeds. In a very real sense, this child is defeated before he ever starts school. He feels so defective and inadequate that even the slightest challenge appears overwhelming to him. Furthermore, he senses that he is a disappointment to his parents, particularly to the mother who almost inevitably must respond differently to him from the way in which she would to a normal offspring, the wished for extension of herself. She has to defend herself against these unacceptable, disturbing feelings of anger; she has to bend over backwards to prove that she really loves this "bad product." Now she tends to be either overly protective or overly indulgent, and, in a sense, begins to stifle the child so that he really cannot utilize the resources that he does possess. All of this contributes quite negatively to the development of the functions which are so important for adjustment and for learning.

The majority of children who suffer with this malady do *not* experience severe reading disorder although, of course, they do have many problems in learning generally. Nevertheless, there is a small percentage whose perceptual and conceptual deficiencies deriving from the early insult to the central nervous system and exacerbated by the reaction of the environment to the defective ego will cause severe problems in reading, particularly in reading comprehension. The etiology, therefore, of this type of reading disorder is *not* defective neural transmission or specific brain cell malfunction but rather is related to the abnormal development of primary functional apparatuses. *Psychological and Educational Characteristics*

What are the psychological and educational characteristics of these youngsters? For one thing, they are almost always hyperactive, hyperdistractible, and disinhibited. The defect in the ego mechanism does not give them the capacity to inhibit or redirect their impulses or to develop social control of them.

These youngsters also evidence inadequate integrative functions. They show problems in concept formation and perception. I am now talking about the child who is able to take in stimuli, but who has trouble fitting them into things he already knows appropriately. He shows tremendous difficulty in making generalizations. It is as though he can only deal with that which is specific and concrete. He cannot engage in the kind of active mental manipulation that is such an essential aspect of abstract conceptualization or generalization.

I am thinking also of the child who has trouble pulling out of his storehouse of knowledge things that are pertinent and that are related to something that is introduced in class discussion. This is illustrative of the child's disorder in the cognitive processes. I am thinking, too, of the child who has a great deal of difficulty in manipulating verbal

concepts. For example, the test of similarities on the individual intelligence test is a very difficult one for children who have experienced brain damage. When they are asked how a plum and peach are alike, they may say "They are not alike." Or they may give a very functional or concrete response like "You eat both of them" or "They both are round." They are unable to give the more abstract concept of "fruit." For the brain damaged children, if external structuring is provided, if they are given concrete examples, very often they can profit from this kind of structuring.

Until now I have been discussing this child in terms of his clinical behavior both in the school situation and while being tested. I would like to turn to some of the things we actually see on psychological and educational evaluations. Characteristically, these youngsters achieve a superior verbal I.Q. in comparison to the non-verbal I.Q. On a performance test, the child has to actively involve himself in a situation and attempt to manipulate a problem to a successful solution. This is quite difficult for a child who has suffered actual brain damage. These children have difficulty in visual organization; they experience problems in spatial relations. The test of block design where they have to take a series of blocks and fit them into a particular design is probably the most difficult of all. What must be done is to break up the problem into its component parts, to analyze the problem, and then to put it back together again. This is analytic-synthetic thinking. It is of interest that if we carry out the analytic portion of the test for the child, he usually is able to do the synthetic portion. Again, if we provide the external structuring, he can be helped considerably.

For the majority of these children, the ability to recognize words is not difficult; most brain damaged children do not have problems in this area. Where they do experience difficulty is being able to understand what they read, being able to engage in inferential thinking, or in being able to see relationships—in essence, being able to comprehend.

SPECIFIC BRAIN INJURY (THE ORGANIC REMEDIAL)

In the classification of reading retardation suggested by Rabinovitch, there is included a syndrome which is described as follows: "Capacity to learn to read is impaired by frank brain damage manifested by clear-cut neurologic deficits. The picture is similar to the early described adult dyslexic syndromes. Other definite aphasic difficulties are generally present. History usually reveals the cause of the brain injury, common agents being prenatal toxicity, birth trauma or anoxia, encephalitis, and head injury. These cases are diagnosed as reading retardations, secondary to brain injury." (2, p. 865) This group differs from the first group I have described in that there is a

specific result of the injury to the brain. That is, the language impairment evidenced by these children is caused by an actual lesion to the occipital-parietal area of the brain. Here, in essence, we view severe reading disability as symptomatic of specific brain injury. In our first classification, we saw impulse problems and learning difficulties related to faulty ego development, which, in turn, had its roots in early insult to the central nervous system.

Psychological and Educational Characteristics

Let us look at the psychological and educational characteristics of these youngsters, particularly as compared with the ego disturbed children described above. In the first place, these youngsters do not show a problem in impulse control that was such an important characteristic of the brain damaged child. Generally, the child with specific brain injury is not distractible or hyperactive. He is usually quite able to adjust to the requirements of the average classroom, at least in terms of his behavior and his ability to concentrate. Where he encounters problems is in any area related to language, and more specifically, his ability to perceive the written word. In these situations, his behavior is likely to change markedly. He recognizes that he is defective in reading, and his frustrations mount rapidly as he continues to experience failure. If he is asked to read above his true instructional level (which is quite likely in most average classrooms) it is almost as if he is being required to climb over a 10 foot wall. He then most likely will tend to withdraw from the reading situation, or in more serious cases, act out his frustrations in an aggressive manner. What must be kept in mind, however, is that this very negative behavior for a long time will be quite circumscribed to the reading situation.

On psychological evaluation, the child with specific brain injury differs strikingly from the youngster with ego-disturbance related to early brain damage. The organic remedial (specific brain injury) invariably has a significantly higher performance I.Q. as compared to his verbal I.Q. (This is just the opposite of what is expected in the previous group). There is a general retardation in the verbal area with practically all of the verbal skills at a low-average to less than average level. The notable exceptions are the relatively (but only relatively) higher scores on the tests of arithmetic reasoning and digit span where language ability is only a minimal requirement. Non-verbal functioning is generally excellent and may be anywhere from average to a very superior level. The only exception to this is on the Coding or Digit Symbol test where the performance is likely to be less than adequate. The problem here is related to the difficulties these youngsters have in any perceptual test involving the association of printed symbols.

The difficulties in association are very significant. These youngsters with specific brain injury evidence much difficulty in being able to

cope with letters and words as symbols. In other words, they cannot associate common experiences and symbols (words) which represent them. Since reading, in the last analysis, is a process of association, difficulty in this area presents a major problem for these children. They tend to have less difficulty in association when both the visual and auditory sensory pathways are involved as compared to the making of strictly visual associations. In other words, they are better able to associate when they are using both the visual and auditory sensory mechanisms.

In contrast to the ego-disturbed brain damaged child, the organic remedial has his greatest difficulty in the perception of the written word. Since this is a specific language deficit, this youngster experiences tremendous difficulty in building up an adequate sight vocabulary. If, on the other hand, material is read to this child, his hearing comprehension will be far superior to his own reading comprehension. The basic problem is in the recognition of the printed word.

Certain reinforcement techniques to aid word recognition such as the kinesthetic or tactile approach may be helpful and important, especially in early stages of working with this type of case. The child learns by writing or tracing words which he pronounces himself, hears pronounced as they are written for him, and so on. Words come from his own oral language background and are learned and written to satisfy present needs. These techniques often work with this kind of youngster because it stimulates other areas of the brain to take over the function of the damaged area.

Thus, the child who has experienced specific brain injury may be labeled as an organic remedial. The term remedial implies that he is experiencing an associative learning difficulty. The adjective organic indicates that there has been a lesion to the occipital-parietal area of the brain. In any event, the psychological and educational characteristics of these youngsters are quite different from the child with ego-disturbance resulting from brain damage.

THE FUNCTIONAL REMEDIAL

In his classification system, Rabinovitch refers to a diagnostic grouping where the "capacity to learn to read is impaired without definite brain damage suggested in the history or on neurological examination. . . . The problem appears to reflect a basic disturbed pattern of neurologic organization. Because this etiology is biologic or endogenous, these cases are diagnosed as primary reading retardations (developmental dyslexia)." (2, p. 865) It is these youngsters that I would prefer to call the "functional remedial."

Assuming that the basic organic endowment is adequate, disturbances can arise from some interference with or delay in the maturation or development of the apparatus functions, which are necessary for

formal academic learning. Certainly there are some children who, for one reason or another, are not prepared for formal learning at the usual age in our culture. In these specific cases which we describe as functional remedial, the problem very likely may be on a genetic basis. However, just because the neurological predisposition to difficulty exists in the child, it does not necessarily or usually mean that the child will develop this reading problem. That is, for a child to develop this kind of problem, he must have this predisposition, but simply because he has the predisposition, does not mean that he will develop the difficulty.

Psychological and Educational Characteristics

With regard to clinical behavior, the functional remedial is essentially the same as the organic remedial, or a youngster with specific brain injury. That is, his behavior is quite normal and acceptable until the time he must deal with reading material. It is only at this point that negativeness, withdrawing tendencies, or acting out behavior is likely to be evident. In all situations where reading is not involved, this youngster is able to function quite effectively.

On a psychological evaluation, the functional remedial will again tend to do much better on a performance test than on a verbal test. However, the lowered score in the verbal area is a function of the selective retardation of specific intellectual capacities. As compared to the organic remedial where there is general retardation, the functional remedial tends to do poorly on the tests of information and arithmetic reasoning. This is specifically related to his inability to focus his attention or to concentrate whenever he must deal with abstract or word-like stimuli.

On tests of associative learning, the functional remedial does poorly whenever he must deal with word-like figures. The mode of presentation (whether visual, auditory, or visual-auditory), is unimportant; what is significant is the stimulus to be associated. The functional remedial experiences severe interference to concentration whenever he must form associations involving word-like objects. This is related to his intense feelings of inadequacy which prevent him from functioning at his true level of intelligence. On the other hand his concentration is excellent when he is removed from any situation involving reading. He exhibits the same performance on tests of memory span—his attention is superior on all tests not utilizing word-like stimuli. The therapeutic approach with the functional remedial is to desensitize the youngster to the reading situation and to provide reinforcement techniques to aid attention and concentration.

CONCLUSION

The purpose of this paper has been to present a differential diagnosis for three types of severe reading disability. The brain damaged

-ego disturbed child, the organic remedial, and the functional remedial all have been considered in terms of their etiology and the psychological and educational characteristics of each. Some will argue that only one type is truly dyslexic in the pure form (the functional remedial). However, this is not important and is only a semantic consideration. What is essential is that we recognize that there is more than one form of severe reading disorder and that each type can be diagnosed and treated differently. In a future paper I will discuss the various remedial procedures effective with each type.

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College-Adult Reading-Past, Present and Future

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THE PAST

One major aspect of college-adult reading, that of its apparent research interests, has been well described by Wark (8). During the period of about 1935 to 1959, Wark found 729 studies which he categorized in 22 types. Among the major trends he detected were the following: 1) increase in the research interest in the reading process and the influence of the factors of vision, visual perception, and personality; and 2) an increase in the studies of programs and their outcomes. Wark was properly critical of many of these "reports to the Dean," as he calls them, for lack of detailed descriptions of methods and materials used to produce their claimed outcomes.

Other increases in research interest noted by Wark were the number of studies dealing with non-college adults and in readability. Minor trends in research in college-adult reading were stimulated for a short period of time by the advent of television, and by interest in rate improvement. Wark's view of the past of college-adult reading provides one picture of the development of the field. Like most areas of behavioral science, college-adult reading tends to reflect social changes, developments in research techniques, and the growth of technology.

Another view of college-adult reading might be gained by a quick review of the early and significant studies of the field. The present author has prepared such a review to be included in the NRC textbook on college-adult reading, when it is released. Let us skim quickly over that historical review, while we flip the pages of an imaginary manuscript, perhaps in the style of Wood's reading pupils.

Although many college-adult programs were initiated some years before, scientific studies of this field did not appear with any great frequency until the 1930's. Among those of some merit were a group emphasizing the readability factors of materials for adults. Strangely enough, the actual reading performances of adults were mentioned only as these bore upon materials of varying difficulty. Observations made included the wide range of ability, the moderate relationship between reading and last school level attained, and the tendency for reading ability to be maintained or even improve among adults with more than five years of schooling. Perhaps there is a clue here for those of the present engaged in adult literacy programs which strive for reading ability commensurate with grade placement or educational level.

The first analytic studies attempting to justify reading improvement efforts with college students and adults appear in the late 30's. Basically, these largely confirmed the observations we have noted above. Buswell's 1939 study (2) is particularly interesting because it now seems quite contemporary in several ways. For example, his major goals in a remedial program (as he termed it) were changes in concentration, *perceptual skills*, and *flexibility*. He sharply decried the exploiting of machines and gadgets to improve recognition span, and he employed the eye-movement camera as a major measurement tool.

Viewed in retrospect, Buswell's study seems quite naive in its research design and statistical aspects. To illustrate, his subjects were not really remedial cases but, rather, most competent readers, even by the standards of that day. The failure to achieve gain in comprehension and vocabulary was undoubtedly due to the very high initial scores of his group. Similarly, changes in recognition span and duration of fixation were minimal, despite Buswell's hopes, because of high level initial performances. However, in demonstrating that rate gains may be induced with some degree of permanence by varied treatment approaches, Buswell was advanced in his thinking beyond even some contemporary "experts."

The interest in the effect of varied treatment methods upon eye-movement behavior persisted into the late 1940's as evidenced in the work of Glock (4), Freeburne (3) and others. To summarize them briefly, these studies demonstrated objectively that various types of rate training produced significant and relatively permanent changes in basic visual patterns in reading. Although neither of these authors stressed the fact greatly, it was also apparent that teacher variance was often more significant than the method of training used—an observation often thought of as a very recent finding.

Since Wark's review of the research in the 40's-50's does not analyze the studies critically, it may be appropriate to make a few retrospective observations. During this period most researchers were quite content to report simple comparisons of pre- and post-training scores as proof of their instructional efficiency. Seldom were objective eye-movement records used, nor was there much attempt to determine (or even promote) a practical transfer of training to the college students' or adults' reading tasks. Even the possible contribution to academic grades, perhaps one of the greatest justifications for reading improvement, was usually ignored.

Another criticism of these studies, and one that bears repeating today, is the failure to control for the motivation of experimental groups (who seek improvement) and control groups (who probably couldn't care less). In contrast, the McDonald study (5) in 1957 at-

tempted to face up to the problems of evaluating the effect upon academic grades among groups controlled for motivation. Fortunately for the future of college-adult reading programs, McDonald demonstrated very positive values in such training.

Industrial and governmental reading programs may have started later than those in colleges, but their growth has been quite marked. Surveys reported in this Conference in 1956 and 1962 indicated that 20-24% of large corporations had such programs and 16-20% more were planning to initiate them soon. These adult programs tend to parallel their college counterparts in methods, materials, procedures and the like, but with a lesser interest in research efforts per se.

Still another view of the development of college reading programs was presented by this author to the Southwest Reading Conference at the 4th annual meeting. (7) Since that yearbook is not generally available, you may forgive me for repeating very briefly the overview presented then. We pointed out that college-adult reading programs really began in the psychological laboratories. Laboratory devices such as the tachistoscope were borrowed by the early college reading teachers who, unfortunately, had little technical background in understanding the true role and actual values of such devices. Most college reading teachers were drawn from the ranks of disciplines other than experimental or educational psychology, and consequently they lacked the research know-how essential to the scientific approach. Group instruction was the common pattern of the American college and college reading teachers readily followed this pattern. Most instructors paid little attention to evaluation of their claimed results by studies which attempted to compare truly equated experimental and control groups, or used objective measures of permanent change as found in eye-movement records, or evaluated teacher variance. Few ever considered that reading gains reflected a combination of the initial scores, the intellectual potential for improvement, the method of training, and the speed of verbal associative power of the trainee.

Mass instruction by imitations of the tachistoscope or by a "skills-drill" workbook program became the order of the day. Because of their basic ignorance of educational psychology, college reading instructors made such assumptions as these:

1. Rate of reading is a unitary trait or a single type of behavior. Training in increasing rate in one or several types of material transfers to other situations.
2. Rates of reading achieved under mechanical motivation will transfer to the usual book reading act.
3. Rate training results in more effective reading in general in comprehension.

4. Most individuals can be taught to read most materials at an increased rate.
5. Personality traits of the trainees, the teacher-group relationship, and the climate of the classroom are not as significant as the method of training.
6. Repeated practice in answering questions of a varied or even a stereotyped pattern based on relatively easy, brief reading selections will produce permanent gains in comprehension.
7. Comprehension itself is fairly constant from one material to another and is probably simply the accurate recall of details.
8. Vocabulary growth is stimulated by a variety of exercises in comparing, contrasting, and memorizing word meanings. It is not thought to be dependent upon the breadth and depth of the concepts or associations related to the words being studied.
9. Memorization of structural elements of words, as roots and affixes, will make a significant contribution to vocabulary growth for most students. The verbal intelligence of the trainee and his degree of interest in etymology are not particularly related to significant use of structural analysis.

These are but a few of the mistaken assumptions which guided college-adult reading through at least its first two decades.

THE PRESENT

At the present time, college and adult reading programs are enjoying a very active life. Each successive survey seems to indicate that the great bulk of colleges and corporations are conducting reading improvement programs or are planning to initiate them. Within only recent years, a great impetus has been given to the spread of reading programs at every scholastic level by the provision of Federal monies.

As Wark has indicated (8), research has tended to shift to the study of the role of teacher and student personality, to the significance of the student's ambitions and self-concept, and to the self-expectations of students. Reflecting this trend, some present-day programs have denigrated the machine, the workbook, and mass instruction to minor roles. In their place, we see extensive use of counseling-oriented practices. This type of program recognizes two postulates: first, that reading is an intellectual task characterized by insight and planning; and secondly, that the variety of causes of reading difficulties makes group remedial instruction impractical. As we have pointed out (7), the counseling program uses tests to help the student understand his performances and to help him assist in planning his program. Instructional materials are created which constantly demand planning of reading approaches. Shifts in behavior according to the demands of the task, and self-evaluation of his adaptive performances are stressed.

In some programs, these materials may follow the principles of operant conditioning, or employ common reading or study skills workbooks. Operationally, counseling programs involve individual and small group counseling sessions, frequent contact between the counselor and trainee, and joint planning of the use of machines or other instructional materials. Class instruction as it is commonly used plays very little part in these client-oriented programs. Students enter the program voluntarily and remain for varying lengths of time as their needs dictate. Post-training tests as measures of absolute gain are de-emphasized in favor of work samples, and student-counselor evaluation of progress. Students are free to re-enter the program at any time during their college career if they encounter academic difficulties.

The counseling-oriented program often serves a number of other goals in addition to its services to college students. It may serve as a training ground for future counselors, psychologists, and remedial teachers. Experiences in supervised interviewing, diagnosis, test administration and interpretation, tutoring of individuals or small groups, and consulting services to local school systems are basic elements in this graduate training program. Clinic data as well as field work often form the bases of graduate research, while some staff members also find time to devise and try out new instructional materials.

Before proceeding to the discussion of the future of college-adult reading, let me hasten to point out that I am not under the illusion that the counseling-oriented program I have attributed to the present fully describes present practices. It is simply presented as a type of current program which represents, in our opinion, the most advanced in the development of the college-adult field.

THE FUTURE

In its basic goals of service to students and training of reading professionals, we do not foresee any major changes in future college-adult programs. Work with trainees may take the direction of the study of behavioral data, as Raygor hoped (6), by including eye-movement data, the study of sub-vocal mechanisms, and the verbal association ability of students. Or as Raygor suggests, we may substitute the intensive, controlled study of the results of instructional changes upon the behavior of individuals, rather than placing our faith in large group studies. It is doubtful that we will begin on any large scale the study of respondent behavior in reaction to the printed word and contrast this with the effectiveness of operant reinforcement of such behavior. Too few reading professionals will be willing to give up the security of drill materials which exercise students in a host of hypothetical skills. After all, when students have practiced answering a pattern of questions, their accuracy, or perhaps it is their comprehension, improves.

The pressure of the expanding college student population may dictate future developments in the use of closed circuit television instruction as Berg (1) has suggested. We may eventually find ourselves teaching reading and study skills to masses of students through this medium. Such a situation would not seem entirely absurd to many clinic directors, for the results of TV instruction as measured by reading tests are not greatly different from those of other group instruction.

"Package" materials which do all things for all students—improve reading skills, correct reading disabilities, create permanent reading interests—will probably increase in variety as well as use. We have not yet been offered many of these for college-adult students, but these will probably appear in the near future.

We also see a very real place for the computer in our future reading programs. Personally, the idea of teaching reading solely or mainly by computer instruction, as suggested by the researchers of one university in this state, is appalling. But we may well see intelligent combinations of computer-assisted instruction with other techniques in the future. Furthermore, the computer may, in the hands of the appropriate investigators, make contributions to the study of facets of our language such as semantic constraint; the reading process itself; the redundancy of letter combinations and language in general, as these too relate to contextual analysis; and the frequency of sentence patterns at various ages in written and oral material. Another area which may lend itself to computer analysis is the redundancy and consistency in meanings of roots and affixes, thus overcoming the present subjectivity in this content. Perhaps our technology will progress to the point that we may be able to stimulate and analyze the way in which an individual learns to decode and encode. Thus we may discover how realistic are concepts of reading based on information theory, associative thinking, and readability. Finally, lest we forget, the computer will certainly play an increasing role in information retrieval and the stimulation of our thinking and our research.

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An Adult Illiteracy Pilot Project: The Training of Reading Aides

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This pilot project, the Training of Reading Aides, was an attempt to overcome the reading problems of the adult urban poor. Perhaps a description of Milwaukee, Wisconsin's, inner city will exemplify the community problem: This area of approximately six square miles (bounded on the south by Juneau Avenue, on the west by 27th Street, on the north by Keefe Avenue, and on the east by Holton Street) contains more than 16% of the city's population in less than 7% of its area. Here live five times the city's density of children per square mile and 90% of Milwaukee's black population. One half of the people living here are under 21 years of age (42% under age 15, and only 2% age 65 or older); 157,000 individuals occupy 45,000 dwellings, almost four people per unit compared to the city average of three. 1,500 families in this area receive general relief, and almost as many, Aid to Dependent Children. One-fourth of the family units have only one parent—a rate six times that of the city as a whole. This area has the highest unemployment rate in the entire State.¹

This community badly needs appropriate educational resources. Twice as many of its children fall behind in school, two students in ten drop out before they reach high school. Of its adults, fewer than 20% have finished high school, and only about three in 100 have completed college. Virtually no programs for continuing education now reach this population. An area of both economic and intellectual poverty, its problems are compounded by bisecting expressways and urban renewal disruptions. The great need is for human renewal. There are over 100,000 functional illiterates in Milwaukee County most of whom live in the area described above. Present programs reach about 3,000 per year. The literacy needs of the inner city poor can be attested to by the high drop out rate and other pertinent information provided by O'Reilly, Downing, and Pflancer.²

DESCRIPTION OF PROJECT

1. The development of the reading aides project was based on the premise that interested, able, and willing adult residents from Milwaukee's inner city could be trained as reading aides; further, that

* The procedures and details of this paper were made possible by a grant under Title I, Higher Education Act of 1965, Proposal for Support of Community Service Project: "#216, Training of Reading Aides."

these trained people would be able to teach and relate more effectively to the people in their own community.

2. The project would help employed adults develop their reading skills to a point where they could be encouraged to seek more education.
3. The use of trained lay reading aides, who were people living in the urban poor areas, would help identify and solve realistic and meaningful problems of illiteracy.
4. As a result of this reading project, a jobless adult could be assisted to find employment and to develop other skills through existing MDTA programs.

GOALS OF THE PROJECT

1. To train inner city residents to be reading aides for teaching the functional illiterate.
2. To promote the idea of "each one teach one" through the use of these lay reading aides.
3. To implement these services in local neighborhood centers.
4. To prepare special materials such as free reading kits as well as auto-instructional, and teacher-made reading materials.
5. To extend the reading services of the University into the inner city where the needs are the greatest.

THE READING AIDES

Potential reading aides were referred to the University Reading Center by the following agencies: The Social Development Commission, The Health Department, The Education Center, The Spanish Speaking Center, Department of Public Welfare, and the Opportunities Industrialization Center.

Out of these referrals, sixteen volunteer aides were selected on the following bases:

1. High school diploma
2. Twenty-one years of age or above
3. Experience working with people
4. Dependability
5. Availability

In addition a final screening was done by the project director and staff regarding the aides' interest, background, schooling, ability to instruct, and willingness to learn.

GROUPING OF AIDES AND COURSE CONTENT

The aides were divided into groups of four, with each group having a cross-section of people from the various agencies represented from the inner city. Four well-trained teachers from the Marquette University Reading staff were each assigned to one of the four groups of aides. Each teacher approached the teaching of reading skills with

emphasis on a different method. The instruction encompassed Laubach literacy materials, self-constructed materials, programmed materials, phonic materials, games, high interest materials, structural programs, as well as training in the use of any and all materials pertinent to the teaching of the functional illiterate, which materials were available on the market.

Instruction was given on a weekly basis throughout the entire program. During the practice sessions the aides taught each other under the supervision of the instructors. The reading aides were provided with a working knowledge of the psychology and principles of teaching reading to the adult illiterate.

At the end of the 10-week training sessions, the aides were provided with "mobile" reading kits made up of all instructional materials used in the training sessions. The aides began working with an illiterate adult of their own choosing. Most of the remediation work was carried out in private homes of inner city people. The weekly training sessions continued at the University, but the sessions now included discussion and evaluation of progress reports along with problem solving situations and further reading instruction. Upon completion of training, a final examination based on the in-service course work was given. The day-to-day lesson plans or log books of the aides were evaluated by their instructors. Based upon these evaluations a certificate of successful completion of in-service training was awarded to the aides.

BENEFITS DERIVED FROM READING AIDES

1. One aide was selected by one of the Inner City Agencies to participate in a three week institute at Wayne State University to receive further training in adult basic education. All of her expenses were paid by this agency.
2. Two aides were hired by the Milwaukee Public School system as teacher aides in their Reading Centers.
3. Two aides were able to use the teaching skills acquired to further themselves in their present positions, i.e., they were given more responsibility in addition to further opportunities to teach.
4. Three aides are now teaching reading at the Spanish Speaking Center.
5. Two aides are considering pursuing teaching as a career and are considering applying for admission to college for formal course work.

All the aides continue to seek out and instruct functional illiterates utilizing skills and use of materials that they had mastered in the training sessions. The Marquette Reading Center staff continues to have contact with the trained aides through the inner city agencies.

COMMENTS AND REACTIONS OF AIDES AND TEACHERS

- Group I The group of four volunteers were very highly self-motivated to do something for other people. The aides easily learned the techniques of teaching, but were surprised at the slow, tedious job of teaching the adult illiterate.
- Group II This group felt the program was extremely worthwhile, and that it was a fine beginning inroad into the solution of a problem which has defied other solutions. By helping teaching aides become proficient in the methods of teaching reading, their enthusiasm was expandable, contagious and satisfying.
- Group III In retrospect, the program was considered a very valuable experience by all members of the group. In fact, all were interested in knowing whether or not the program would be held the following year as friends and fellow workers were interested in attending these classes. The aides found the materials helpful and adequate.
- Group IV The aides became very concerned about their own children's reading difficulties. They felt this program gave them insights into helping their own children with reading. An enthusiasm for a wide range of reading was developed among the aides themselves. They were hopeful that more training of such a nature would be available.

RECOMMENDATIONS

1. Aides should begin working with a student earlier in the training program.
2. Instructional and tutorial sessions should be held in the inner city rather than on the university campus.
3. The aides should be paid a small amount to defray transportation costs.
4. Opportunities should be provided for the aides to be observed while instructing their students.
5. There is a need for continued reading skills training to make the aides more proficient in their teaching.
6. A center in the inner city should be available and staffed by these aides in order to reach more illiterate adults, as well as providing more job opportunities for the trained aides.

CONCLUSIONS:

This was a one year pilot project to explore the feasibility of training adult inner city residents to teach the functional illiterate in their own community. Based upon the requests from inner city agencies and the community itself for more trained aides it is felt that the program was a success. The second phase of this project should be devoted to research and study of the effectiveness of the project. This phase

would likewise employ evaluative procedures, gather and analyze data in order to determine the extent to which the objectives of the program have been achieved.

1. Data gathered under the sponsorship of Marquette University's Project #94, "Universities' Community Educational Services for Metropolitan Areas," (U.C.E.S.M.A.) Title I, Higher Education Act, 1965.
2. O'Reilly, Downing and Pflaumer, "The People of the Inner-Core North." (Monograph) New York, Le Play Research, Inc., 1965, p. 1.

APPENDIX I

MOTT

Basic Language Skills—300A
 Basic Language Skills—300B
 Word Bank—300
 Instruction Manual—New Edition
 Placement Test
 Student Workbook for Sound and Structure

—Allied Education Council

THE HOME AND FAMILY LIFE SERIES.

Croft Education Services
 Getting Started—Communication I
 On the Way—Communications II
 Full Speed Ahead—Communications III
 Reading for a Purpose

—Follett Publishing Co.

SIGHT PHRASE CARDS

—Garrard Publishing Company

PHONETIC WORD DRILL CARDS, 300 WORDS

—Kenworthy Educational

PHONETIC WORD DRILL CARDS, 300 WORDS

Service, Inc.

STUDENT KITS

—Laubach Literacy, Inc.

- Series 1: Be Informed on Personal Credit
 2: Be Informed on Buying an Auto
 3: Be Informed on Owning an Auto
 4: Be Informed on Buying a House,
 Parts 1, 2, 3, 4, & 5
 5: Be Informed on Personal Insurance,
 Parts 1, 2, 3, 4, & 5
 6: Be Informed on Renting a House
 7: Be Informed on Finding a Job, Parts 1, 2, 3, 4 & 5

New Readers Press

THE COMPLETE SPECTRUM OF SKILLS

—The MacMillan Co., School Dept.

PROGRAMMED READING FOR ADULTS.

A Sullivan Associates Program
 by Cynthia Dee Buchanan

McGraw-Hill Book Co.

MERRILL LINGUISTIC READERS—A BASIC PROGRAM

—Charles E. Merrill Books, Inc.

STEPS TO LEARNING

—Steck-Vaughn Company

Evaluation of an Informal Reading Inventory for the Blind¹

Allen Berger

The University of Alberta

During the summer of 1966, the investigator taught two courses in Olean, New York, a small city in the Allegheny Mountains near the Pennsylvania border. The courses were concerned with foundations of reading instruction and language arts in the elementary school. These summer extension courses were offered through the auspices of the State University of New York at Fredonia.

One of the students who took both courses was a teacher of the blind in nearby Allegany. Mrs. Constance R. Kautz was employed by the Board of Cooperative Educational Services, Cattaraugus County, Allegany, New York Central School. As the summer progressed, the idea of developing an informal reading inventory for the blind gradually emerged.

The investigator reviewed the literature and engaged in correspondence with prominent educators in the field of the blind and visually handicapped. He visited the American Printing House for the Blind, the American Foundation for the Blind, the Lighthouse, the Lavelle School for the Blind, and the Perkins School for the Blind. The review of the literature and the encouragement from educators in the field of the blind appeared to support the need for the adaptation and evaluation of an informal reading inventory for the blind.

PURPOSE

This investigation was designed to adapt the first formal Informal Reading Inventory for the Blind and to test two hypotheses with the newly-adapted instrument.

The *Braille Informal Reading Inventory* is a diagnostic instrument composed of a series of word lists and passages to be read orally and silently. These words and passages increase in reading difficulty with the word lists ranging from pre-primer through sixth grade and the passages from pre-primer through seventh grade. Following the reading of each passage is a comprehension check. Also included are passages to determine listening comprehension level.

¹ The research reported herein was performed pursuant to a grant from the Office of Education, U. S. Department of Health, Education, and Welfare. The *Braille Informal Reading Inventory* will be available from the American Printing House for the Blind, 1839 Frankfort Avenue, Louisville, Kentucky 40206.

The Braille IRI is based upon selected Diagnostic Tests in the *Sheldon Basic Reading Series*. Permission to reproduce the material in braille was given by Allyn and Bacon, Inc.

With the Braille IRI the following hypotheses were tested:

1. There will be no differences for each grade level between the reading comprehension scores obtained on a *Braille Informal Reading Inventory* and the reading comprehension scores obtained on a standardized achievement test in Braille.
2. There will be no differences for each grade level between the word recognition scores obtained on a *Braille Informal Reading Inventory* and the word meaning scores obtained on a standardized achievement test in Braille.

In regard to the second hypothesis, the original intent was to compare the word recognition scores on the Braille IRI with word recognition scores on a standardized test in braille. The *Stanford Achievement Test* does not contain a word recognition section (although a primary SAT battery contains a word reading section). Consequently, the word meaning section of the SAT was used in the comparison. Although word recognition and word meaning are not synonymous, the difference is one of degree rather than kind.

PROCEDURE

This investigation was conducted during the 1967-68 school year. Participating were 147 children, 86 boys and 61 girls, in kindergarten through Grade 9, in the Illinois area. Included were children from the Champaign Public School System, the Chicago Public School System, the Illinois Braille and Sight Saving School (at Jacksonville), the Missouri School for the Blind (at St. Louis), and the Evansville-Vanderburgh Consolidated School Corporation in Indiana. Also involved were children from the Milwaukee Public School System.

In making the initial adaptation of the inventory for use with blind children, the investigator and Mrs. Kautz examined the ink print published copies of the Diagnostic Tests in the *Sheldon Basic Reading Series*. Changes were made where deemed necessary. These changes included the addition of questions following the reading of the passages. The remainder of the adaptation of the Braille IRI followed the testing of the braille readers.

The assistant who did the testing was trained in the use of informal reading inventories by the investigator. Other staff assistants involved in the investigation also gave valuable suggestions to the examiner, who performed a number of preparatory tests first on sighted children and then on blind adults and children.

Testing the children took five months, from November through March, 1968. During this time and shortly thereafter, *Stanford Achievement Test* scores and intelligence test scores were also obtained. Scores were obtained from the *Interim Hayes-Binet Intelli-*

gence Test for children in Grades 1 and 2 and from the *Wechsler Intelligence Scale for Children* for those in Grades 3 and above. The collection of the data was completed by May 1968.

MEASURING INSTRUMENTS

The major measuring instruments used in this investigation were the following: the newly-adapted *Braille Informal Reading Inventory*; the *Stanford Achievement Test*, Braille Edition (Form J); the *Interim Hayes-Binet Intelligence Test for the Blind*; and the *Wechsler Intelligence Scale for Children*.

STATISTICAL ANALYSIS

In order to test the hypotheses, a correlated *t* test was used. These tests were made separately for boys and girls and also for residential and day school pupils. Relationships among the twenty variables were determined by the product-moment correlation coefficient.

RESULTS

Data relating to the first hypothesis tested are presented in Table 1. Inspection of Table 1 reveals four significant differences between pairs of means at the .01 level of significance. Other means tend toward significant differences at a lower level of significance.

On the basis of data presented in Table 1, the first hypothesis, which stated that there would be no differences for each grade level between the reading comprehension scores obtained on a *Braille Informal Reading Inventory* and the reading comprehension scores obtained on a standardized achievement test in Braille, was rejected.

Data relating to the second hypothesis tested are presented in Table 2. Inspection of Table 1 reveals six significant differences between pairs of means at the .01 level of significance.

TABLE 1
CORRELATED *t* TESTS FOR PAIRS OF MEANS BY GRADE LEVELS ON
COMPREHENSION SECTION OF BRAILLE INFORMAL READING INVENTORY
AND STANFORD ACHIEVEMENT TEST (BRAILLE)

Grade	N	Mean Score (Independent Level) Informal Reading Inventory	SD	Mean Score Stanford Achievement Test	SD	<i>t</i>
2	8	1.00	.75	2.15	.73	5.16**
3	16	2.44	1.07	2.85	1.27	1.63
4	12	2.88	1.12	4.11	1.02	4.28**
5	18	4.39	1.12	4.83	1.79	1.41
6	12	4.83	1.25	5.58	1.40	1.61
7	16	4.72	1.51	6.17	1.84	4.56**
8	15	5.57	1.24	6.95	2.31	2.87**

** $p < .01$

Note: Grade 1 was omitted because of the small N having complete testing data.

TABLE 2
CORRELATED *t* TESTS FOR PAIRS OF MEANS BY GRADE LEVELS ON
WORD SECTION OF BRAILLE INFORMAL READING INVENTORY
AND STANFORD ACHIEVEMENT TEST (BRAILLE)

Grade	N	Mean Score (Independent Level) Informal Reading Inventory	SD	Mean Score Stanford Achievement Test	SD	<i>t</i>
2	8	.56	.46	3.34	.54	11.27**
3	16	1.72	1.37	3.27	.99	3.69**
4	12	2.63	1.65	4.66	.64	4.64**
5	18	4.67	1.41	5.17	1.05	1.64
6	12	4.46	1.93	5.77	1.58	3.26**
7	16	5.50	.79	8.44	2.13	5.28**
8	15	5.47	1.20	8.62	2.27	5.67**

** $p < .01$

Note: Grade 1 was omitted because of the small N having complete testing data.

On the basis of data presented in Table 2, the second hypothesis, which stated that there would be no differences for each grade level between the word recognition scores obtained on a *Braille Informal Reading Inventory* and the word meaning scores obtained on a standardized achievement test in Braille, was rejected.

Further analyses were conducted to determine the effects of sex, intelligence, and type of school on the results. These analyses indicated that sex and intelligence did not significantly influence the results of the investigation. Pupils in the day schools, however, tended to score lower than those in the residential schools. However, this finding should be considered in light of the fact that, in this sample, more of the day school pupils were in the lower grades.

Examination of the raw data relating to the reading of the paragraphs on the *Braille Informal Reading Inventory* seemed to indicate that the pupils did consistently better when they read the paragraphs orally than when they read them silently. Analyses were performed to determine the extent of the difference in comprehension on the passages read orally and on those read silently. Results indicated that the pupils attained a mean comprehension score of 90.71 per cent on the passages read orally and a mean comprehension score of 69.38 per cent on the passages read silently, a difference significant at the .01 level ($N = 112$; $t = 8.60$).

The intercorrelation matrix between the twenty independent and dependent variables reveals interesting relationships. For example, relatively high coefficients exist between the Braille IRI Listening Comprehension Level and other variables such as SAT Word Meaning Grade Equivalent, SAT Paragraph Meaning Grade Equivalent, and Wechsler Intelligence Scale for Children.

DISCUSSION AND IMPLICATIONS

The fact that the two hypotheses were rejected is not surprising in light of the findings of Leibert (26), Spache (40), and others (9, 10, 25, 27, 28, 30), in connection with sighted readers. Essentially, they found that a standardized test score reflects the frustration level of the pupil. Millsap (31) found that most teachers were unaware that the standardized test score reflects the pupil's frustration level.

Similar findings have been observed in this investigation involving braille readers. Attention was given to the independent reading level (e.g., homework level). It is clear that the level at which the pupil is able to read braille independently is two grade levels below the score he attained on the standardized achievement test.

As a result of this investigation, teachers now have available an instrument which will allow them to diagnose accurately the reading levels and strengths and weaknesses of braille readers. The implications of diagnosing the independent, instructional, and frustration levels of each child are immense. Too often pupils are taught on their frustration level. Often they are taught at a level too easy for them. In either case, many pupils tend to react in the form of discipline problems. The prevention and alleviation of many discipline problems result when pupils are taught at their instructional level.

The *Braille Informal Reading Inventory* also reveals to teachers the specific strengths and weaknesses in each pupil's repertoire of reading skills. If a pupil has difficulty with a specific kind of contractions, and not other kinds, then the teacher can correct this specific learning deficit. In a similar vein, the pupil who can find the main idea of a passage but not details needs instruction different from the pupil who can recall details but not the main idea. Teachers will find that certain pupils seem to have difficulty with questions involving numbers, or inferences.

Teachers of the blind should consider the possible implications of the findings that, in this sample, pupils had a far greater level of comprehension when they read orally. The exact meaning of this finding is not certain. However, the possibility exists that oral feedback aids blind children in comprehending what they read. There is another possibility, however, that children are learning how to read orally with comprehension but not silently with comprehension, which is the situation for most sighted children.

Of additional significance to education is the research value of the *Braille Informal Reading Inventory*. The need to determine reading levels is cited by Kederis and Morris (2) in a report of a project completed under the overall direction of Carson Y. Nolan. In their conclusions, they write: "Motivation, *levels of reading skill*, and type of practice material are all parameters whose effects should be more fully determined," (*italics mine*).

In short, it appears that teachers of braille now have available an instrument that will enhance the effectiveness and efficiency of their performance in the classrooms. It is hoped that others sharing the responsibility for the education of children—particularly administrators, counselors, investigators, psychologists, book company representatives, and test publishers—will give continued consideration to the differences between an informal reading inventory and a standardized test.

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Use of Automated Aural-Oral Techniques to Teach Functional Illiterates Who Are Upper Age Level Adolescents

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THE THEORY

While reading is most certainly a visual experience, a native born adult illiterate can be taught to read through his ears. With his accumulative experiences as an individual in interplay with society, the adult illiterate possesses a wide range of understanding in how the American tribe operates. He possesses a relatively large speaking-hearing vocabulary resulting from his past experiences; he also possesses, if properly motivated, a capacity for intense concentration and single-minded toil toward goals that he understands and accepts. Consequently, by capitalizing on the adult's ear-mouth maturities and on his understandings and capacities as an adult, the teacher may be able to teach the adult illiterate to read. Because the adult's speaking-hearing vocabulary is already developed from a backlog of adult experiences, the teacher need have little concern with controlled vocabulary or graded word lists. Essentially, then, teaching of reading to adults through aural-oral techniques consists of developing a bridge by which the student's ear-mouth maturities can be transferred into his eye-recognition development. The adult's accumulated system of oral meaning signals simply needs to be translated into a printed system of meaning signals.

THE LOCATION

The Reading Laboratory Program at the Gary Job Corps Center, San Marcos, Texas, includes the use of an automated electronic laboratory. Viewed as a pilot study in a new area, the use of the electronic laboratory suggests the possible validity of the use of aural-oral techniques to teach reading. Designed as a speed-up device to reinforce the regular classroom teachers' efforts, the fifty minutes laboratory program is in addition to the student's fifty minutes in the regular language classroom. Operating through the media of a modified language laboratory, the reading program offers aural-oral instruction from pre-recorded audio tapes, a mechanized system of self-contained modules of instruction. Essentially, the electronic and mechanical arrangements of the laboratory complex allow for complete individualization of program presentation and a constant immediate availability of the instructor. This simulation of the ideal of one teacher-one student ratio offers many advantages. Individualization of instruction

and constant availability of a teacher are especially important for Job Corps illiterates.

THE CLIENTELE

As drop-outs and push-outs of the public school apparatus, Job Corps illiterates present challenges for the teacher. Whether for medical disorders, emotional hang-ups, physical deprivation, social isolation, or economic disadvantages, Corpsmen essentially are adolescents unable to compete in a most competitive society, especially with their peers. As adolescents, Corpsmen experience the same strains as their more fortunate brothers but with more complications. Quite a few Corpsmen are veterans of more sex, more violence, more pain, and more practiced television and movie house fantasies than the usual thirty-year-old, middle class citizen. The adult experiences juxtaposed with the growing pains of adolescence produce certain deviate behaviors with special qualities. Special characteristics of illiterate Corpsmen, referred from the Testing Center and from Communication Skills classes on the basis of a series of standardized tests, include a strong sense of failure and a poor self-image—a lack of self-assurance and self-identity, rather short attention spans, both overt and barely-below-surface hostilities, great reliance on folk mythologies, tendencies toward fantasy, and sub-standard dialects. Rather common, also, are physical barriers such as poor eye sight and underdeveloped coordination. The effect of malnutrition is also no stranger to the laboratory.

APPLIED THEORY

Since Corpsmen are near-adults and possess the oral fluencies and many of the social understandings of adults, the aural-oral techniques of teaching adult illiterates to read may apply to the teaching of Corpsmen to read.

Corpsmen need more motivation and personal guidance than adults. Often, Corpsmen's reading problems are bound with emotional problems; therefore, success with these illiterate near-adults presupposes a large emphasis on teacher counseling, flexibility in pacing of curricular content, and complete individualization. The automated aural-oral environment afforded in the laboratory program provides all three features. Each student has a private station, an individual control panel by which he can pace his own lesson, and an individual cartridge lesson, prescribed by the instructor after a diagnosis of the student's needs through initial and follow-up testing and counseling. The sequence of the lessons may be varied at will by routing the reader horizontally into additional drill on a troublesome point or vertically into a new area of learning. The instructional staff monitors the student's work in his station and is available for special help.

The program is a blend of aural-oral clues and programmed techniques, influenced by linguistic insights. The student listens to his pre-recorded lesson and responds orally. He responds to further aural

stimuli by seeing and writing the printed forms of his aural content items. Thus the student is hearing, speaking, seeing, and writing responses to aural stimuli in sequential, developmental, reinforcing small units. Within each self-contained module of instruction, the student checks his accuracy. Correct answers to his written answers are offered, and the replay of his tape module offers him an aural comparison of his oral responses and the teacher's voice, especially in producing and identifying the individual sounds and in pronunciations of words, phrases, and sentences. Correct responses are reinforced, and incorrect responses can be identified and replaced. This immediate aural feedback of his oral and written performances allows the student to assess his progress.

Content of the program involves work with the sound system through auditory discrimination, visual discrimination, and structural analysis. Also involved are illustrations of and developmental work in the processes of affixation, compounding, syllabication, and foreign borrowing. To give the student a reference guide for his independent reading, dictionary skills are also developed. Throughout the different phases of the program, the reading passages are constructed to reflect the Corpsmen's immediate environment; that is, the passages deal with the geographic, economic, social, and vocational conditions and situations through which the Corpsmen operate during their stay at the Gary Center. Such "customizing" of the passages to make them as pertinent, interesting, and useful as possible to the Corpsmen yields many returns in continued motivation and character development. In presentation of the sound system, a phonic approach is used. While a phonemic approach may be more desirable in terms of developing awareness of linguistic patterns on which to build more advanced understandings, a phonic approach seems more appropriate at this particular time segment of total program development. Since the primary strategy of the program is to offer students a technique of translating printed units into the already known aural language patterns, the phonic approach (basically, a given spelling is pronounced in a certain way) has merit: the learner can get meaning from the reading through his aural skills. This approach, rather than the sound-based phonemic one, does not prevent the use of linguistic insights of syntax—the significance of word order, inflection, and function words in communication. Finally, since phoneticians and linguists do not agree on the number of phonemes in the American language, and since the majority of dictionary makers continue to include pronunciations which sometimes vary from ordinary practice, a phonic approach seems at this point to be the most manageable system to use with this particular clientele.

In all phases of the program, especially in the teaching of the sound system, the teacher's voice is the principal stimulator and director of action and model of standard dialect. Through the inter-

play between the teacher's voice and the student's aural-oral skills, audio clues trigger associations between the aural, oral, and printed forms and stimulate recognition of printed forms as units of meaning. To reinforce the recognition of printed forms as meaningful units, the student reproduces the printed forms. Throughout his laboratory experience, the student remains "tuned in" for meaning through the automated aural-oral environment.

THE RESULTS OF APPLICATION

Students enter the laboratory at a public school level of at least 3.5 years and remain until they attain a level of 5.8 years or above, as measured by the Gates-MacGinitie Series—Form No. C-1 at entry and Form No. D-1 upon termination. Students' progress can be expressed in terms of "years gain per instructional month." The "instructional month" is defined as equivalent to forty hours of instruction: there are about twenty instructional days in a month, and on each day the student spends one fifty minute period in the regular classroom and another fifty minute period in the laboratory.

A recent random survey of student gains made during the first thirty-four months of laboratory operation, from October 15, 1965, to July 24, 1968, indicated a mean gain in vocabulary development of .53 school years per instructional month, with a range from a negative .44 to a positive 6.80, and a standard deviation of .92. There was a mean gain in comprehension of .65 school years per instructional month with a range from a negative 1.05 to a positive 4.15, and a standard deviation of .95. The mean length of the Corpsmen's total instructional time in the laboratory was 3.33 instructional months.

A word of caution is in order, however, before many conclusions can be accepted from the data from this pilot program. Since Corpsmen eventually compete with the general school population, it may seem appropriate to use standardized tests to measure Corpsmen's gains. However, the use of standardized tests like the Gates-MacGinitie to measure gains of Corpsmen may not be valid because the socio-economic-ethnic differences between the general public school population on which the test was standardized and the Corpsmen may be so large that the apparent results may not be realistic. Any statement of gains as measured in the random sample by these tests must be considered only as indicative because of the differences between the norm population and the study population, the lack of a control group, and the fact that this is a demonstration study. The reported gains must be taken as indicators rather than absolute conclusions. The reported gains do seem, however, to indicate that the program is meeting the Corpsmen's needs with effective techniques of instruction. The test results, as well as observed performance of the students in their other school tasks, are reinforcing to the staff and students. If the program works as well as it seems from the limited and qualified evidence, two

factors are probably responsible: (1) the individualization of instruction by which the student can pace his own learning and become more responsible for focusing on his personal problems and their solution, and (2) the horizontal-vertical mobility whereby the student can move back and forth, and up and down among the various language levels. A programmed structure which directs the experiences with the different language levels and forms—aural, oral, visual, manual—to intensify and reinforce each other so that printed symbols are automatically translated into meaning is the objective of the aural-oral laboratory.

PROJECTIONS

The staff is not satisfied with the program as it operates. The staff hopes to improve the system, to use other's insights and invention as well. Areas of investigation include at least the following: (1) Investigation of the "set" theory of spelling sounds. At present, that system is unrealistic in the Job Corps because the initial reading experiences are so rigidly limited. (2) Greater emphasis on the syntactical elements of reading may furnish greater carry over into other language experiences. (3) Various rationales between sound-graphemic relationships as they appear in the often sub-standard dialect, which is the pattern of the Corpsmen, and the idealized phonic relationships need to be developed. Through these rationales the laboratory program could be further refined so that Corpsmen's progress toward standard American pronunciation could at least equal and thereby offset the obviously lacking realism in attempting to teach the student to pronounce a word in a way he will not aurally recognize. The sub-standard dialect's interference with instruction is further compounded when the dialect is a result of some Corpsmen's retaining the patterns of their original non-English language and juxtaposing the retained patterns onto English patterns and vocabulary. To treat these special problems of extra dimension, sophisticated rationales need to be developed. Finally, future program development should be conducted under experimental conditions so that any results will not have to be qualified by the limitations necessarily associated with this pilot study.

CONCLUSION

The use of automated aural-oral techniques to teach fundamental illiterates who are upper age level adolescents seems a promising technique. Through enabling the students to lock their oral communication systems into the printed communication system by which a linear, literate, structured, technological civilization is operated, the laboratory program provides the students "a chance to cast away the ancient iron key of the dungeon of the past and fashion a new key built to fit the lock of the universe as they live in it." (1, p. 9).

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The SR/SE Laboratory: A Systems Approach to Reading/Study Skills Counseling

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INTRODUCTION

Before describing the SR/SE Systems Laboratory that is in operation at Loyola University of Los Angeles, some brief remarks are necessary to delineate its rationale and development. No attempt will be made in this paper to justify the need for reading/study skills programs at the college level. This thesis has been cogently argued in the professional literature, notably by Brown (2) in his philosophical rationalization of reading improvement programs; by Aukerman (1) who surveyed opinions of presidents of 300 state colleges and universities; by Ketcham (8) who investigated professorial attitudes toward reading improvement programs; and by Lowe (9) who summarized forty-nine published surveys of college reading/study skills programs.

SR/SE SYSTEMS RATIONALE

Underlying the development of the SR/SE systems approach to study skills counseling at Loyola University of Los Angeles are a number of assumptions that are neither new nor original. They can be found in current literature on individual differences, learning theories, reading and study skills, counseling techniques, and instructional technology. These assumptions affirm that

- ... learning begins where the student is
- ... learning how-to-learn can be learned
- ... learning must be meaningful and goal-oriented
- ... learning is a process
- ... learning is not always easy nor is it always fun
- ... learning can be personal regardless of numbers of students
- ... each student is unique
- ... each student is a fellow human being
- ... students can and do learn by themselves
- ... students do learn from each other
- ... students learn at different rates
- ... students learn in different ways
- ... diagnosis, referral, and follow-up are synonymous with counseling
- ... computerization need not be dehumanizing
- ... individual learning can be economical

Implicit in these assumptions is a rejection of many traditional reading/study skills materials and practices and, consequently, a search for an approach that would combine personal attention with individual learning.

A search through the yearbooks of the National Reading Conference, the College Reading Association, and the North Central Read-

ing Association reveals few descriptions of programs that combine personal attention with individual learning. Most programs are class-centered. The first report of an individualized approach to reading/study skills instruction was made in 1961 by Barbara Edwards of Auburn University (7). At Auburn, students tailored the course to their individual needs, interests, and objectives through the use of an ingenious bibliography numbering nearly 200 items which they used under the guidance of the reading staff to remediate and develop their reading and study skills. One year later, Martha Maxwell and Thomas Magoon (10) writing in *The Journal of College Student Personnel* described the new "self-directed" educational skills program at the University of Maryland where emphasis was placed on self-improvement rather than on remediation; where individuals worked at their own level, content, and rate; where self-help replaced semi-formal instruction; and where special differentiated materials were used to help students improve in reading speed and comprehension, study methods, vocabulary, listening skills, and spelling. Two years later, Raygor and Summers (11) described their work at the University of Minnesota Reading and Study Skills Center reporting that programmed instruction materials and techniques "... finally gave us the idea for what has turned out to be a real administrative or organizational breakthrough." This breakthrough made possible supervised individual practice work based on diagnosis and interview. In a later NRC yearbook, Cranney (5) described the evolution of this same program at Minnesota. Finally, in 1967, Gil Williams (12) described the development for individual students. Although Williams discussed further uses of a computer to analyze reading tests scores on the Nelson-Denny and thus identify special comprehension, rate, and vocabulary problems for individual students. Although Williams discusses further uses of the computer for individualizing instruction, it is not made clear in his report whether in fact the San Bernardino Valley College Reading Center uses it beyond the analysis of Nelson-Denny test scores.

It seems evident, however, that Williams deserves credit for introducing the concept of the "systems approach"—a phrase that was already at that time widely used and accepted in engineering and in business training programs—into published college reading literature.

As one reads a definition of the "systems approach," one can understand the movement away from traditional reading instruction to personal, individualized student learning. David Curl (6), writing in an article aimed at training directors in business and industry, might have been describing the changing programs at Auburn, Maryland, Minnesota, and San Bernardino when he defined the systems approach as

... a systematic attempt to coordinate all aspects of a problem toward a specific objective. In education and training this means planned, organized use of learning resources for achievement of required behavioral ob-

jectives by the most efficient means practicable. This precludes the teacher-centered approach. No longer may content and pacing of 'today's lesson' be left to the whim of the individual classroom instructor. The systems approach means focusing first upon the learner and the performance required of him, and then, and only then, making decisions about course content, learning experiences, and choice of most effective media and instructional tactics.

The SR/SE Systems Laboratory at Loyola University of Los Angeles, as developed by the author, has its roots in the pioneering work at Auburn, Maryland, and Minnesota as well as being indebted to the dynamic concepts espoused by the new instructional technology that considers audio-visual materials, programmed instruction, simulation, and the use of the computer as integral components of a learning system.

Although a modified systems approach to reading/study skills had been practiced by the author for some years, it only became a viable operation during the spring and summer of 1968 when the author completed and field tested a reading and study skills inventory. Published in late summer of 1968, this inventory *Survey of Reading/Study Efficiency* (4), is significantly different from its predecessors* listed in Buross (3). Specifically, it differs in six important ways: 1) it identifies a wider range of reading/study attitudes, habits, and skills; 2) it gives to the student and counselor instant feedback by means of an easily read profile with a further capability of delayed feedback through an individualized and personalized computer print-out; 3) it programs a student into appropriate reading/study skills tests, exercises, materials, and related activities for specific remediation or development; 4) it provides for student and counselor a follow-up routine as well as repeated interaction; 5) it allows for counselor modification of recommendations as new techniques and materials become available; and 6) it permits a wide variety of pedagogical approaches as determined by computer analysis of SR/SE data on large groups of respondents.

SR/SE SYSTEMS DESCRIPTION

Although Loyola freshmen ordinarily take the *Survey of Reading/Study Efficiency* as part of their college orientation program, the SR/SE is administered at any time during a student's four years to initiate him into the SR/SE Systems Laboratory which is actually a number of centers where reading and study skills materials—workbooks, manuals, programmed texts, tapes, records, filmstrips, films, and tests—are available for student use under the direction of a counselor. A list of

* *Tests in Print* reference numbers, authors, and titles of the five reading and study skills inventories alluded to above are given here for those who do not have access to *Tests in Print* (3).

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|-------|--|
| [131] | Borow, <i>The College Inventory of Academic Adjustment</i> |
| [152] | Brown Holtzman, <i>Survey of Study Habits and Attitudes</i> |
| [152] | Carter, <i>California Study Methods Survey</i> |
| [153] | Wrenn, <i>Study Habits Inventory, Revised Edition</i> |
| [153] | Traxler, <i>Survey of Study Habits, Experimental Edition</i> |

materials currently in use with the SR/SE Systems Laboratory can be found in the *Manual for Instructors and Counselors* and the *Personal Program Guide*, two components of the *Survey of Reading/Study Efficiency* that was mentioned above. At the present time, the main center is located in the Student Union Building with a smaller center based in the library. Approval has been given to extend the center to each resident hall and, one fraternity has voted the necessary funds (approximately \$500.00) to establish one in its house. These sub-centers will allow students greater opportunity to explore and develop their learning potential in a systematic and personal way.

The SR/SE Systems Laboratory at Loyola University of Los Angeles is part of the Study Skills Center that also includes a Writing Laboratory, a Speech Improvement Laboratory, and an English-As-A-Second-Language Service. Administratively under the Chief Student Personnel Officer, the Study Skills Center is not a part of the Education, English, or Psychology Departments although it co-ordinates its services with them. Like other Student Personnel Services, it exists to serve the needs of students specifically attending to those problems that impair learning efficiency.

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Case Studies Behavior Modification

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AN HISTORICAL HYPERVIEW

It is probably easier to predict the behavior of historians than to forecast historical trends. After all, historians constitute a fairly small subset of the total human population. If we start with a limited number of events, we can hazard a prediction of their responses to those events. Therefore it is feasible to forecast the behavior of the psychological-historian heir to the great E. B. Boring. When that as yet unspecified scholar writes the next great history of psychology he will probably summarize the early decades of the twentieth century as the Ideological Phase of the Behavioral Revolution. Let us list and summarize the importance of the men whose contributions were the data base for this predicted summary.

The first name on the list is that of J. B. Watson. He proposed a consistent, systematic attack on the validity of consciousness as a psychological entity (1913). He drew up the outline of an objective behavior science, devoid of any decorative mental dangles. (In the lingo of the 1960's, Watson blew a whole generation's mind—blew it right out of the laboratory.) He sharpened the thrust of the Behavioral Revolution—a revolt against fuzzy mentalisms such as feeling, images, and consciousness which were important only as sources of polemic disagreements, or as excess baggage as explanation of data.

There are of course other names on the list: Edwin Holt, Karl Lashley, E. C. Tolman and Clark Hull. But in this hyperview none are as important as that of B. F. Skinner. His well articulated text, *Behavior of Organisms* (1938) brought distinct order to the study of observable behavior. He made a fundamental ideological distinction between two classes of response—those elicited by a stimulus and those emitted without an external, specifiable stimulus. The first type is called *respondent* behaviors; the second is labeled *operant*, since it contains all the behaviors which "operate" on the environment. The internal, mental "reason" for the emission of an operant is of no scientific concern.

The observed responses and their spacio-temporal control are the proper data of psychology. The fact that Skinner chose to study rodents and birds in order to assure adequate experimental control is immaterial. The basic findings had broad applicability. They demonstrated that at least ideologically, a behavioral psychology was sound.

The 1950's might well be called the Tactical Phase of the Behavioral Revolution. The objective of many psychologists in the period seemed to have been, in part at least, the rigorous study of significant

human problems. John Dollard and Neal Miller, in their book *Personality and Psychotherapy* (1950), made an attempt to apply the notions of drive, stimulus, reinforcement, and punishment. They suggested, in part, a reformulation of parts of Freud's ego system in terms of behavior psychology.

In the middle of the decade three psychologists carried the work further, extending it from a plausible reconstruction of all human behavior to the controlled study of specific problems. Sidney Bijou (1954) working with normal and retarded children; Ogden Lindsley (1954) working with hospitalized psychotics; Joseph Wolpe (1954) working with neurotic outpatients—all three contributed much to our knowledge. Clearly, they were capitalizing on and extending the similarities between human and lower organisms. Within a year Joel Greenspoon (1955) demonstrated that the verbal reinforcements could have a significant effect on verbal behavior, the area of uniquely human activity. Four years later Allyon and Michael (1959) brought much of the previous research thinking into focus by demonstrating that psychiatric nurses could be used as behavioral engineers. Nurses were trained to produce striking changes in hospitalized humans by using behavioral techniques. All of the above contributed basic documentation to what I would call the Tactical Phase of the Behavioral Revolution.

The decade of the 1960's showed a definite increase in research falling under the heading Tactical Phase. Our hypothetical future historian will be able to cite the specific objectives of the campaign: the solution of genuine wide-scale problems and social concern. He will be able to cite research in problems of education, child rearing, interpersonal behavior, and individual mental health. For example, early in the decade Holland and Skinner (1961) published *The Analysis of Behavior*. This was both a popularized summary of Skinner's groundbreaking laboratory investigations and a validated teaching document. It was in fact the first well known attempt to apply behavior technology to education via programmed instruction. Lund-saine and Grazier's edited volume *Teaching Machines and Programmed Learning* (1960) gave a picture of the vigor (and occasionally misdirected enthusiasm) of the field. Krasner and Ulman (1965) and Ulman and Krasner (1965) published books on the theory and application of behavior modification. These books showed quite clearly the impact of the Revolution on the practice of psychology. The illustrations were taken from work with retarded, hospitalized, and young human beings. Up to that point relatively little had been done working with adult students in the area of concern to specialists in college reading.

In summary, given the above events, it seems reasonable to predict that the early and middle decades of the century would be called the

Ideological and Tactical Phases of the Behavioral Revolution. The research will demonstrate the impressive results of rejecting any concern for "mind" and concentrating on objective, external behavior. Later in the last half of the century we will probably see the Strategic Phase. Behavior modification will be used to prevent, rather than to ameliorate, large scale social problems. Finally the revolution will disappear as most revolutions do. It will become absorbed into the ongoing culture. But that is a speculation about the future. What about the current situation?

GRANDMOTHER AS A BEHAVIOR MODIFIER—AN INSTRUCTIVE DIGRESSION

Some people feel that behavior modification is an arcane title for a basic technique. Any grandmother, the argument runs, can do the behavior modification thing with a cookie jar and a birch rod. The assertion has a certain face simplicity. But any psychologist knows first of all that granny may not be very efficient. Almost any learning theorist can probably get longer and better control over behavior by judicious and economical withholding of cookies. He would summarize that part of his technology under the heading of a periodic reinforcement. He also knows that the timing used to present the cookies or apply the rod can have striking effects. He would summarize those techniques under the heading of scheduling effects. Finally, he knows that granny's often mistimed tenderness or attention may serve to increase the very temper tantrums or naughtiness she wishes to erase. Thus he would talk about the contingencies for all behaviors, not just those associated with the jar and the rod. In point of fact, the statement about granny has the same simplicity, and is about as valid, as the claim that any old biddy can teach college reading with a set of alphabet blocks and a dictionary. The old girl may possibly be effective, but she will probably not be efficient.

It is not the purpose of this paper to give a complete catalog of behavior modification techniques; many are not even dreamed of by Grandma. Krasner and Ulman do that beautifully (1965). But it is appropriate here to mention that what's involved are some fairly sophisticated concerns for stimulus control, objective measurement, contingency analysis and management, reward and/or punishment timing, all undergirded by a consistent systematic focus upon external behavior. Ogden Lindsely summarized the methodology fairly well. In his work with teachers, youngsters, and parents at the University of Kansas Medical Center he uses the following formulation: pinpoint behavior, record the instances of behavior so selected, manipulate the consequences, and try, try again (1967).

BEHAVIOR MODIFICATION OF READING AND STUDY SKILLS

Let us now turn to the application of behavior modification techniques to college students. The staff in the Reading and Study Skills

Center at the University of Minnesota has published several studies reporting their attempts to manipulate reading rate and other relevant study behaviors: Raygor, Wark and Warren (1966), Wark (1967), Wark, Kolb and Tonn (1968), and Wark and Raygor, in press. These efforts have been conceived in a rather straightforward operant paradigm. The contingency in most cases has been a confirming stimulus signal given to the readers when they go above or below some specific criterion of rate. Other behaviors, such as handwriting, have also been manipulated. The work has been done for the most part with college students in a rather constrained laboratory situation. With two exceptions there do not seem to have been other reports in the literature of work with this population. The two exceptions, by Sulzer (1965), and Lange (1963), dealt with study problems which were secondary to a clinical concern. The present paper reports case studies in a more typical situation with apparently normal students.

CONTEXT OF THE CASES

The cases reported here are all those of students in a University of Minnesota Extension Division course in How to Study. The students in the past have included a 17 year old high school student trying to improve grades, a young secretary returning to college after several years in the work force, a college sophomore drop-out trying to build up credits for re-entry, a salesman planning to continue his education, and classroom teachers picking up techniques for application in their own school room or their own advanced study. There have been occasional husband and wife pairs and an occasional mother-daughter team. (In the latter cases it is not entirely clear who was the team leader.) In short, the population from which the cases are taken is extensive.

The objectives of the course are as varied as the students. Those with no college experience start from scratch. Those with weak study skills wish to increase and strengthen what they have. The course is individualized to the extent that half of each class session is devoted to supervised individual practice on a broad range of skills.

OVERVIEW OF THE COURSE

Students are taught initially to chart their own study behavior using a textbook of their choice. The behavior measured is rate of reading in 15 or 20 minute intervals. Initially students record and graph their study as an exercise in self-observation. Later these graphs serve as base rates for evaluating hoped for improvement. In a unit half way through the course the students are given instructions in techniques of behavior modification. They are assigned to a part of these self selected techniques to their self-selected problems. The contingencies and payoffs are chosen by the student. The instructor functions merely as a consultant. The reports of this paper are taken from the behavior modification course.

DOWN TO CASES

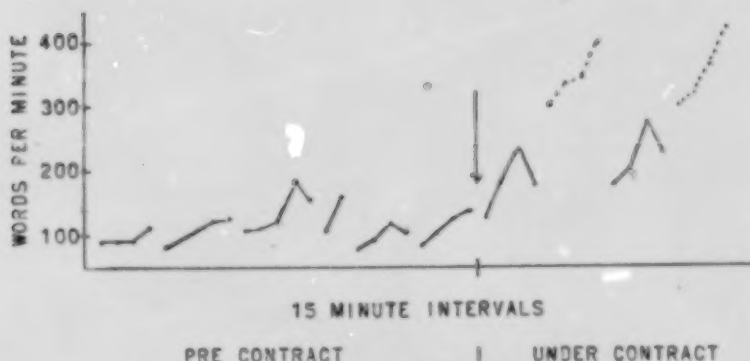
Case # 1. Case # 1 is a 35 year old Sister in a religious teaching order. She holds a B.S. degree. In part she enrolled to learn some techniques that she could pass on and teach her students. Secondarily she feels that she has problems separating major and minor details in her own reading. She tends to be meticulous and careful in her work.

Prior to the modification procedure her study reading was about 100 words a minute without underlining. Her recreational reading rate was initially quite high. She used a modified Premark contract, with amount of study the cost for amount of recreational reading. Her results are presented in figure 1.

NAME: SISTER MARGARET

BEHAVIOR: INCREASE RATE

CONTRACT: FOR 1 PAGE TEXT UNDERLINED _____
READ 2 PAGES RECREATION-----



tile for University of Minnesota freshmen. On the initial night of class he reported his main problem as getting started on home work. He wished to increase his speed and learn to take notes. Starting on the 20th of September and continuing until the 18th of November, Terry submitted no home work. Although threatened with dismissal from class, he produced nothing. (The Granny method failed again.) On the 18th of November at his own suggestion he decided to use 15 minutes of rock and roll music as a reward for five minutes of text reading. The contract was signed and witnessed in class. The situation was surrounded with a certain seriousness and formality. Prior to that occasion Terry had been quiet and reticent to make comments in class. On the Monday following the 18th, Terry came to class with his chart shown in figure 2.

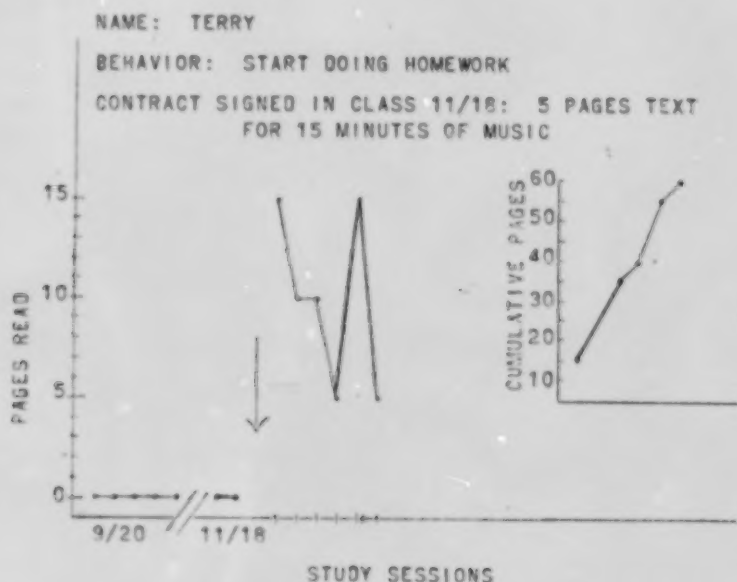


FIGURE 2

Terry presented his chart to the class. The other students expressed their obvious approval. Following the presentation Terry talked a great deal, participated in class, and has continued to be a lively contributor. He reports that now he no longer needs to use the music as a reinforcer for study.

It is, of course, significant that Terry himself chose to enter into this particular contract. Without his self-commitment it's unlikely

that any kind of behavior modification techniques would work. However, it seems likely that he made similar resolutions in the past which did not produce changes in behavior. Apparently what is significant here is his own commitment, plus a specific consequence for that behavior, plus the social pressure engendered when other students witnessed his contract. It is, of course, impossible to tease out the relative effectiveness of the variables. Nor is it particularly important to do so. Considering Terry's initial lack of output the difference is quite marked!

Case # 3. Jane is a 23 year old college graduate. She showed a pattern of achievement opposite to that of Terry. That is, her high school achievement put her in the upper quarter, but her tested ability was in the lowest quarter for University of Minnesota students. She enrolled in a course to improve her reading speed, comprehension, and concentration. She is an unusually pretty woman, although rather shy and embarrassed easily by classroom discussion. Prior to the behavior modification assignments she rarely volunteered any comments in class. Her hobby interests include training a German shepherd for obedience trials. She selected a contract which would develop both faster and wider reading. Initially, she set the terms such that for every 20 pages she would walk her dog one mile. Because of her interest in training this was a satisfying, rewarding situation for her. She charted her rate of reading and presented the results in figure 3.

NAME: JANE

BEHAVIOR: FASTER READING

CONTRACT: FOR EVERY 20 PAGES, WALK DOG 1 MILE

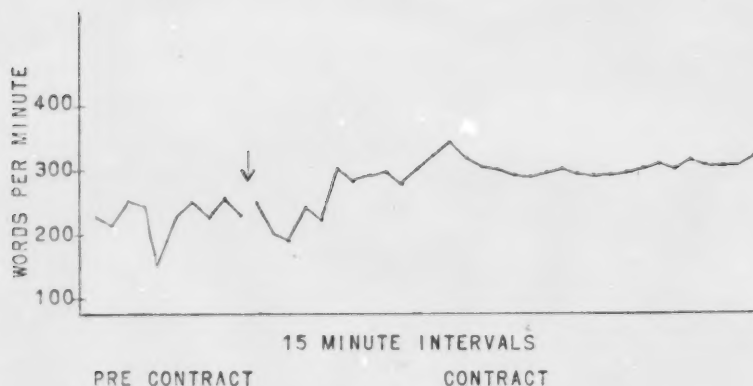


FIGURE 3

We note that after the contract was placed in effect there was a slight initial drop. Then the contingency took hold and the rate increased to 275 words a minute for study type reading. When the rate stabilized she entered into a second contract involving a higher criterion. The results are presented in figure 4.

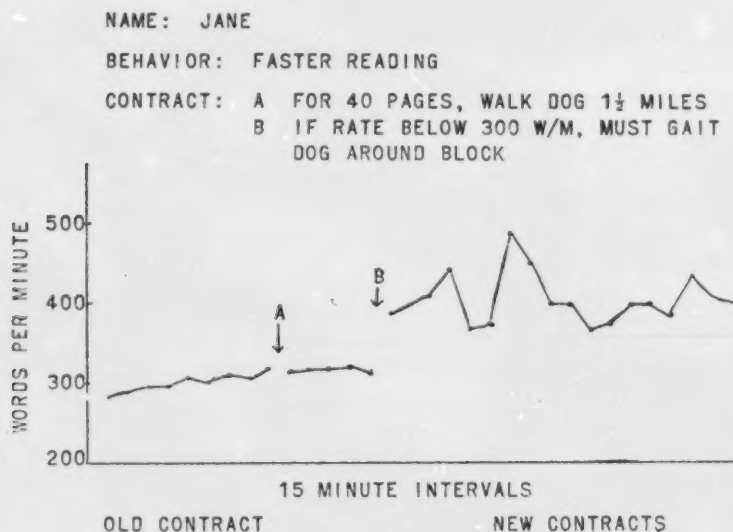


FIGURE 4

The first segment of figure 4 is a base rate from the contract summarized in figure 3. Under the new contract in segment A for 40 pages she would walk her dog one and one half miles. In relation to her first contract this constitutes a 100 per cent increase in behavior for a 50 per cent increase in reward. She found minimal effects. At that point, she instigated a new contract in segment B. Instead of reward she set up an avoidance situation. Gaiting involves running the dog and is somewhat aversive to her. She decided that if her rate fell below 300 words per minute she would gait the dog twice around the block. This resulted in an immediate jump in her rate.

The use of self-applied avoidance is rather interesting. We notice first of all that her rate never fell below 300 words per minute and so she did not have to apply the unpleasant contingency. We might well wonder whether or not the contract would have worked if she had not had prior experience with the unpleasantness of gaiting.

Case # 4. Wayne is a 25 year old high school graduate with some college experience. His aptitude score puts him in the lower third of

University of Minnesota freshmen. Initially he reports he has trouble getting started with study. He works as a supervisor for a section of clerical personnel. He reports being effective on the job but wishes to continue his college education.

His selected contingency was to wear a rather disreputable sport coat if he did not put in a full 60 minutes of study each night.

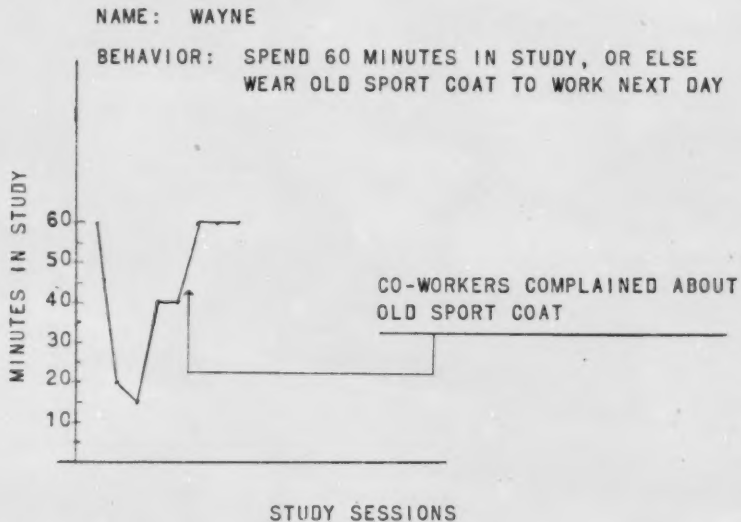


FIGURE 5

The effect took hold only after his subordinates kidded him about his dress. In the week after submitting the graph he reports obtaining a good 60 minute study period merely by hanging the sport coat over his desk.

Here, as in Terry's case, we see the effectiveness of social pressure in maintaining study behavior. However, in this case the effect was fortuitous. If he did not have the kind of relationship on the job which allowed his staff members to kid him about the sport coat, or if they did not notice the sport coat, then the contingency would not have worked.

Case # 5. Mary is a 32 year old high school graduate with one and one half years of junior college. She is a trained X-ray technologist, and has worked as assistant director and instructor in a private X-ray technology school. She is married and has several children. She chain smoked during the class hour. She decided to use smoking as a contingency in improving her reading rate.

NAME: MARY

BEHAVIOR: FASTER STUDY RATE

CONTRACT: IF RATE GOES BELOW 300 W/M THEN
NO SMOKING FOR NEXT HOUR

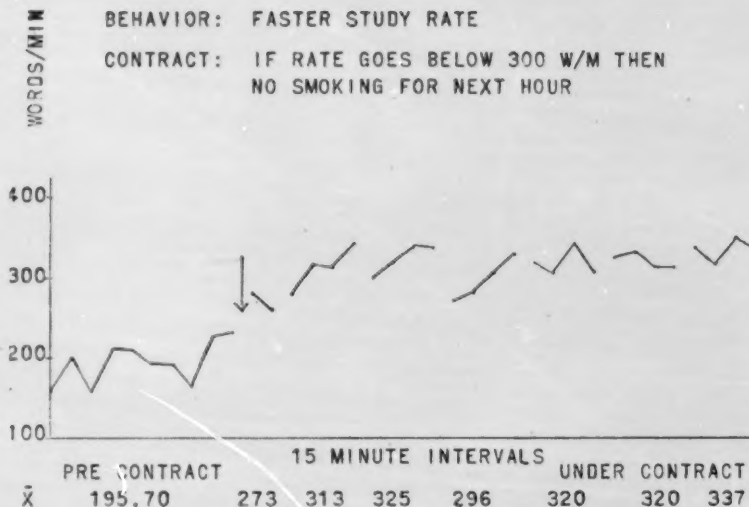


FIGURE 6

Her contract reported in figure 6 took hold almost immediately. She also reports a secondary effect. During the hour when she could not smoke she had to keep herself busy by running around doing her housework. Thus we find that she used her old habit, smoking, both as a method for increasing study and as a reward for faster housework. She reports being very happy with her accomplishments.

Again we have a situation in which an aversive technique is used to reinforce study. Mary calls non-smoking her "penance." As in Jane's case it was probably effective both because she was committed to the improvement and because she had prior experience with the unpleasantness of non-smoking.

SUMMARY

The cases illustrate some of the potential for the direct modification of relevant school behavior by non constrained adults. Of course in many cases we focus on reading rate. On one hand, this is a more or less trivial concern. It is no great trick to push around measured reading rate. See for example Raygor, Wark and Warren, (1966). These gains in rate reported in this study are not terribly impressive in comparison to the usual changes on standardized tests. Most reading improvement programs demonstrated doubling of rate over an average of eight weeks. However, there is a point to consider here. Very little is actually known about the rate in which students read

their text books in a free situation. In fact, Randall (1943) reports that knowing a student's rate on a standardized test improves prediction of reading rate in a free situation only five per cent above guessing. That is, knowing how a student does on a reading test gives almost no information on how he actually reads while studying. It may be that a change of 25 or 50 words a minute while studying and underlining, note taking and so on may be a very defendable and impressive gain. A much broader survey of study behavior under natural situations is certainly called for. The study of Yarrington (1967) shows that there are tremendous differences in pages read per hour in different content fields and that there are significant differences in rate as a function of the week in the quarter. That study deserves much closer attention by anyone interested in actual student study behaviors.

The fact that these cases focus on rate and amount of time in front of a book does not justify their dismissal as trivial. In point of fact there is theoretical and empirical justification for the notion that the increase in rate may have widespread beneficial effects. The cases of Terry and Mary both show generalization to other behaviors in the class room and at home. This is then the basis for the educational experience. Students are expected to learn things in the class room which they apply elsewhere. Analogously, students learning to control their study behavior may then learn self-manipulating techniques which may be applied elsewhere. From a theoretical point of view the notion of "skill therapy" (Sayles 1963) gives a rationale for this way of evaluation.

There is a question of whether these gains are likely to be maintained. Thus we would wonder whether Mary's non-smoking will change or whether she will use it to maintain further effective study. However, the continuation of behavior modification is not a specific problem for these cases. We could raise the question of whether any behaviors learned in a classroom are maintained in the future. This applies to arithmetic computation as well as reading rate. Just because these behaviors were changed by non conventional techniques does not justify increased concern for their retention. I submit that things learned by behavior modification are no more and no less subject to the laws of forgetting and extinction than behaviors learned in any other way. The question of retention is really a question of stimulus control and repeated practice.

In the last analysis, the methods reported here have worked. They are a few of the possible techniques which should be considered by any reading and study skills specialist. The grandmothers of the world need not throw away their cookie jars and birch rods. But they should jolly well learn some new technologies for their efficient application. After all, Grandma is just as subject to the laws of behavior as is Dennis the Menace.

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Assessing Skimming and Scanning Skills Improvement

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Although most reading programs include practice in skimming and scanning along with other reading skills, there is little agreement among reading specialists concerning the nature of skimming, its relative position among other reading skills (e.g., should it be considered a higher level skill?), the occasions for which it is appropriate and the techniques for teaching it. In this paper, results from some preliminary studies designed to shed some light on these questions in the process of developing and evaluating a skimming and scanning improvement program¹ will be discussed.

What is meant by skimming and scanning? Moore (1962) concluded as the result of his investigations that skimming was a different skill from rapid reading, normal reading, or slow reading. He found that skimmers fixate fewer times and have more highly individualized eye movement patterns than normal readers. Furthermore, he reported that most skimmers "suffer little loss of comprehension from skimming."

Although there are several definitions for skimming and scanning, we have arbitrarily defined skimming as the skill involved in locating the main idea of a selection quickly, and scanning as searching for the answer to a specific question or fact, for the purposes of this paper.

The skimming and scanning improvement program grew out of several needs. First, we found that college students typically reported that they used skimming and scanning skills in their college work. Secondly, the results of a survey of freshmen at the University of Maryland showed that the majority reported their interest in taking a course to improve these skills. Third, in attempting to teach students to skim and scan, the lack of suitable, college level material was apparent.

So the program was built from realistic college text-book material selected from social sciences, science, and essays, plus a section on scanning bibliographies and indexes. Four types of exercises were written for each selection: skimming for the main idea, scanning for details, scanning for words and phrases (or vocabulary terms in the science selections), and general comprehension questions for more in-

¹ The program referred to is *Skimming and Scanning Improvement* to be published by McGraw-Hill in March, 1969.

tensive reading. Exercises were administered to randomly selected groups of regular college students for testing, and questions were item-analyzed and revised.

Later forms of the program were tested on students enrolled in rapid reading classes and also on students working in an individualized reading laboratory.

Since it was soon apparent that the student's set or attitude was a crucial factor in his improvement, a set of myths about reading which must be overcome before one can progress were written. These included such myths as "I have to read every word"; "reading once is enough"; "it's sinful to skip in reading"; "there's something about my eyes that prevents me from rapidly" etc. Students typically work through these myths before beginning intensive practice on skimming and scanning.

In checking out techniques for skimming and scanning, it was found that the best technique was to reduce the amount of time the student was permitted to read the selection so that he was forced to try short-cuts. A number of techniques are described in the program which individual students have found useful, but individuals appear to vary greatly in the techniques that work best for them. In developing skimming skills, considerable stress was placed on using organizational clues.

SUMMARY OF RESEARCH FINDINGS ON SKIMMING AND SCANNING IMPROVEMENT

1. *Many students cannot locate main ideas quickly.*

Item analyses of responses to questions in the *Skimming and Scanning Improvement Exercises* revealed that questions requiring students to skim for main ideas were most frequently omitted regardless of whether the questions asked were open-ended or multiple-choice in format. In one exercise involving locating the answers to two main idea questions, fewer than 25% of a group of college students got both correct. The same exercise was tested on 9 faculty and staff members with roughly the same results—only two of the group were able to locate the main ideas within the time limit. (Both were former Freshman English instructors.)

2. *Students prefer to scan for details rather than skim for major points.*

Whenever the skimming and scanning materials were used, students reported that they preferred to scan for words, phrases, or facts rather than skim for main ideas. Whether this reflects their inability to locate main ideas quickly or the fact that skimming requires more active thinking than looking skills involved in scanning, and is, therefore, more distasteful are interesting speculations for future research.

3. *Rapid scanning speeds are associated with higher accuracy.*

In several studies, it was found that students who worked rapidly on the exercises tended to make fewer errors than those who worked slowly. This conclusion seems to hold regardless of the type of exercise or questions asked.

4. *Students will not skim and scan unless they are frantically pushed for time.*

In three studies involving the amount of time students take to complete exercises, we have found that unless close time limits are observed, students will lapse into their normal slow reading patterns. For example, Herson (1967) studied 44 University of Maryland students enrolled in two special reading improvement workshops. One group was given instructions on how to skim and then told to skim, read and review a selection from a zoology text. The controls were given instructions to read the same material. No significant difference between the mean comprehension scores of the two groups was found, but the time limit for both groups allowed students to read at the leisurely rate of 188 words per minute.

Our clinical experience suggests that most students have a reservoir of speed reading skills which remains untapped until they are placed in a threatening situation where they have much more to read and study than they have the time to complete. Under these circumstances, some students will naturally develop skimming and scanning techniques; others compromise by maintaining their slow reading habits and risk poor grades by completing only part of their assignments. We have found these latter students are the ones who can profit most by learning skimming and scanning techniques.

It takes more than suggestions and a few practice sessions to improve skimming and scanning techniques.

The results of four studies suggest that presenting techniques and giving one to three hours of practice will *not* change students' habits in skimming and scanning. In one study involving a Solomon-Four Experimental Design, one group was given skimming techniques and three practice exercises; a second group was given two practice sessions but no techniques; a third group was given a second skimming technique and two practice sessions; and the fourth group was merely post-tested. The results of the analysis of variance showed no significant differences between groups on the post-test (Reading Versatility Test).

Van Brunt (1968) studied changes on Raygor's "Skimming and Scanning Test" for a group of 14 students enrolled in a brief rapid reading course. Although the students had completed five *Skimming and Scanning Improvement* exercises, and showed 35% improvement on their average scores on the post-test, these gains were not statistically significant.

Incorporating Skimming and Scanning Skills into a Rapid Reading Course Appears to Strengthen Reading Rate Gains.

Although previous investigators such as LaFitte (1963) have failed to show differential rate gains for students trained in skimming skills compared to those who used rapid reading drills, two of our recent studies support the above principle. Maxwell, Herson and Van Brunt (1968) found that students in a group program using *Skimming and Scanning Improvement Exercises* as well as SRA materials and machines showed significantly higher mean speed gains than students working with SRA materials and machines in a traditional individualized program. Both groups spent 10 hours in the program. Van Brunt (1968) found that 14 students completing a 33-hour program including 5 exercises in *Skimming and Scanning Improvement* showed significant gains in reading rate and vocabulary scores, although, as noted previously, their scores on Raygor's *Skimming and Scanning Test* did not improve significantly.

Attitudinal Factors are Important in Developing Effective Skimming and Scanning Skills.

Many authors have long held that student attitudes are a significant factor in reading skills improvement. As mentioned previously, our experience with compulsive students who need help in changing their negative attitudes and fears about speed reading prompted us to include a series of myths about reading improvement. Furthermore, an analysis of the responses of 159 students in a reading improvement program to a semantic differential test showed that twice as many (66%) of the students who evaluated skimming and rapid reading as "bad" also rated them "difficult." If a student feels that skimming and scanning are "bad" and "difficult", he will need help in changing his attitudes along with techniques for skills improvement.

MEASURING CHANGE

Most standardized reading tests do not measure skimming and scanning skills and are, therefore, quite useless in diagnosing difficulties or reflecting improvement in these skills. A recent attempt to measure skimming and scanning is the Reading Versatility Test² by McDonald, et al. However, this test suffers from the basic problem that all tests purporting to measure skimming face—that is the impossibility of constructing more than one or two items per selection which measure the ability to find the main idea. Thus a statistically reliable measure of skimming skills is virtually impossible to construct. As indicated previously, time limits must be carefully observed or skimming ability will be confused with reading level. The Reading Versatility Test does provide an index of whether a student can skim or not, but does not indicate the extent to which he has developed the skill.

² The Reading Versatility Test is published by Educational Developmental Laboratories.

Recently, Raygor³ has developed a skimming and scanning test which involves searching bibliographies, indexes, charts, and textbook pages for specific facts. The test has 30 items and a 10-minute time limit. Typical college freshmen complete fewer than half the items. This test shows promise in reflecting changes in scanning skills although data are still being compiled on its effectiveness. Until better instruments are devised, we are left with informal measures such as within a time limit or the number of phrases he locates within a selection in 30 seconds. Crude though these may be, they can reflect the the number of main idea questions the student completes correctly kinds of skimming and scanning changes we hope to produce in students.

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³ Raygor's Skimming and Scanning Test is to be published by the California Test Bureau.

The Publisher's Role in the Evaluation of Materials

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In putting together these remarks for presentation I have kept reminding myself, and want to remind you, that I'm speaking as an editor of New Media Development in the College Textbook Division of McGraw-Hill Book Company. Among other things, this means that I am not in an executive or policy-making position for my company or for the industry at large; rather I am commenting on editorial developments that I see taking place around me, developments which I myself have had a hand in.

I want to mention as a general introduction, some of the forces that are shaping the changes in the publisher's role in educational materials. I have said the educational publisher's role is changing, and perhaps this change is a radical one. The traditional role of the educational publisher (at least in the college textbook field, which is what I know best) has been essentially a benign yet passive one. The publisher receives manuscripts, selects wisely among them, edits them, designs them, and prints and publishes them. This pattern is changing. The current role involves the generation of systems and the planning and carrying out of system implementation in the field. And it will increasingly be the publisher's role to evaluate materials.

Now, this is a totally new role which involves not only *initiation* of materials but also their *evaluation*. I'd like to point out that I think these are very important concepts. We have not in the past felt concerned to ask professors for data about their textbooks. Now, however, one of the basic questions which we are increasingly asking our authors is this: what evidence do you have that this textbook is readable and, further, that it teaches anything? The implicit assumption in developing textbooks used to be, of course, that if the professor-author presented the material in a logical and coherent manner, the student would automatically learn. Now, it is necessary to stop making that assumption. We have changed our thinking sufficiently so that we are changing the role of the professor in the preparation of text materials. With publishers participating in the development of materials, the author has new and more complex responsibilities which he must share with the publisher. No longer is it sufficient for an author to be an expert in his field and on the basis of that reputation produce publishable materials. Rather the publisher is now asking the author to participate as a member of a team in the development of learning materials.

We as publishers are finding that we can be the stimulus in developing materials; we can be a controlling force in monitoring the quality and the testing materials that are submitted to us and that we accept for publication. The increasing power and responsibility that we are assuming necessarily is changing the meaning of words like "author", to the point where an author is no longer responsible for producing a finished manuscript, but is part of a process in which the manuscript is developed, not authored. I think that many of you will understand from your own field, reading, the distinction I am trying to make. A basal reading series, for example, is a publishing project of immense complication. In no sense of the original understanding of the word, is it "authored." It is a long, developmental process in which extensive tryouts of the materials are done in the field.

As an index of the change I am describing so generally here, in the college textbook field we have found it necessary to redefine certain terms that for a long time have been stabilized with a rather ordinary set of meanings. Let's examine some of these terms, and start with one already mentioned, that is, *author*. No longer is an author a single person who, from his experience as a teacher and as a subject-matter expert, puts together a textbook. An author, we are now finding, is a series of experts in preparing instructional objectives and translating them into behavioral objectives; experts who know their subject matter and who are conversant with the process of evaluation. Furthermore, *author* is beginning to mean a specialized educational service, whose business it is to prepare, evaluate, or assist in the evaluation of materials, according to the publisher's specifications.

The word *system* also has special significance to us as a term for the careful integration of objectives, materials, and tests to accompany those materials, which can be demonstrated to have the desired learning effect for the intended population. We are turning to professional *producers* for our multimedia materials. These producers are typically specialists who handle the production of films and tapes and slides of an educational nature, and they necessarily assume some of the role which the publisher and the old-fashioned type of author formerly held. The producer takes on essentially some of the responsibility for preparing the "manuscript," that is, material suitable for a publisher to publish, and the producer takes on some of the publisher's role in the actual manufacture of the final product.

This redefinition of terms is indicative of the new and complex demands placed on the publisher. He is now responsible for the *evaluation* of materials, and by evaluation, I mean a careful process of collecting data on the performances of educational materials in the field. We can summarize this process on the following three ways:

- 1) The debugging of materials; that is, taking informal but objective data on how learners perform when actually working with the materials.

- 2) The reformulation of those materials on the basis of the objective data secured.
- 3) A validation study done on those materials, based on a field tryout of the materials in their completed, revised form; that is, materials in the form which will most closely approximate the final published version.

Michael Scriven¹ has concisely described the above evaluation procedure by reducing the process to two stages:

- 1) The *formative* stage, which is the time the unit is still fluid or in the process of being revised on the basis of objective feedback.
- 2) The *summative* stage, which is the process of collecting data on a final or overall evaluation so that conclusions can be made about the final product.

In this paper I will refer to various evaluative procedures which I discuss as belonging to either of these two categories of Scriven's: that is, the *formative* for the stage in which revision is still possible and the purpose for obtaining data is to tell the publisher how to make the revisions, and the *summative* in which the purpose of the data collection is to provide the publisher and the consumer with some index of how the product actually performs or has been shown to perform in the field.

I hope these changes in terminology and functions which I have mentioned will illustrate somewhat the radical nature of the change we are witnessing. I want to illustrate what we are doing in evaluation by drawing on three studies which McGraw-Hill Book Company has recently undertaken in the routine task of preparing these materials for publication. Of course, other companies have assuredly done notable work in evaluation along these same lines, but of necessity I can report on only those data and studies which I have access to. The three studies come from three different divisions of McGraw-Hill Book Company. The first is an evaluation of two pre-school film units from our Textfilm division. The second is an evaluation of the Listen-Look-Learn reading series from our Educational Developmental Laboratories, and the final one is a study done on one unit in a reading series which is a part of a Basic Skills System from our College Textbook Division.

Turning to the first study² of two pre-school units, the Textfilm Division recently sought to provide data on two productions, a film, "Learning to Look at Hands," and a filmstrip, "Learning to Look at Colors." This evaluation was in Scriven's definition a *summative* one.

¹ Scriven, Michael, "The Methodology of Evaluation" in Tyler, Gagne, and Scriven, *Perspectives of Curriculum Evaluation*, Rand McNally, Chicago, 1967.

² "Final Report on the Effectiveness of Two Filmic Units Prepared for Pre-school Children by McGraw-Hill Book Company" by the Brooks Foundation, Santa Barbara, California.

It was validation data taken from two already produced instructional units. I might add that these units posed a certain problem in evaluation because they had been produced very much in the way we produce a traditional textbook. There was no specific formative evaluation undertaken, nor were the objectives for the film units stated in behavioral terms. This summative evaluation was done by the Brooks Foundation of Santa Barbara, California, which is a nonprofit, independent research organization hired by McGraw-Hill for this purpose. Here is what they did. They developed a design working with a general statement of educational objectives. From these objectives they derived three measures with implied goal statements in which they could gather empirical data. These measures were 1) extent of student learning, 2) teacher-response behavior following a single viewing of each film unit, and 3) participation and attention measures taken directly from some video recordings.

For each of these three measures, specific procedures were mapped out by which data could be generated and evaluated. For the first one, *the extent of student learning*, verbal pre- and post-tests were constructed to measure the discrimination of colors and the various kinds of hand gestures which the film had demonstrated. For the second one, *evaluating teacher-response behavior*, a video recording was made of the teacher interacting with the students after the initial showing of the film or the filmstrip. And in the third instance, participation and attention measures, a video recording was again used to evaluate, according to predetermined criteria, the amount of participation or attention on the part of the children while viewing the film. This then summarizes the research design used by the Brooks Foundation in evaluating summatively these two film units for the Textfilm Division. This really is a kind of elementary and necessary research which publishers have not heretofore been involved in; we plan to publish such summative evaluations, and I predict a likely result will be the generation of higher selection standards on the part of the consumer. I also think this policy of disclosure of summative evaluation results will probably, as Robert Locke noted in his address to the AERA in February, 1968,³ be not only a boon to the customers of the educational materials, but will also turn out to be a shrewd marketing strategy for the publisher.

Now I would like to cite and briefly describe another *summative* evaluation from another McGraw-Hill division, Educational Developmental Laboratories. This study⁴ was conducted on the Listen-Look-Learn System, which is a basal reading program. After two years of

³ "The Responsibility for Evaluation: A Political and Business View," by Robert W. Locke, paper given at AERA, February 8, 1968.

⁴ "Preliminary Report of Summative Evaluation of the Listen-Look-Learn System, Cycles 1-40, 1967-68" by Ann Brickner, Research Department, Educational Developmental Laboratories.

formative evaluation on the part of EDL, their research department set up an evaluation of the final form of Listen-Look Learn. Generally, the research design utilized an analysis of variance and an analysis of covariance with a factorial design providing the overall structure. To provide a setting for the analysis, the Listen-Look Learn System was used in twenty-eight first grade classrooms, while twenty-eight other first grade classrooms were used as controls. The control classes used the basal materials already adopted by their local districts. To provide data for analysis, four tests were used: the Metropolitan Readiness Tests, the Pintner-Cunningham Primary Test, the Cooperative Primary Tests, and the Stanford Achievement Test. The variables that were examined were

- 1) Treatment; a control vs. an experimental group,
- 2) The above with ability held constant,
- 3) Sex; separate analyses for male and female.

To cite the findings of these analyses would be to exceed the scope and purpose of this paper. It is sufficient to note that a legitimate and full-scale research effort has been undertaken in this instance.

As a third and final example of the types of evaluation that McGraw-Hill is currently engaged in, I would like to describe some studies done on a college level developmental reading unit, one of a series in a forthcoming publication: McGraw-Hill Basic Skills System. We performed both formative and summative evaluations upon the unit in question: Reading for the Main Idea.

The formative evaluation consisted first of a series of author try-outs with a small sample of subjects at the University of Minnesota. A formal study was conducted at Spring Lake Park High School.⁵ Two versions of the program—they differed both in response format and sequencing of material—were evaluated. The design was a comparison of group outcomes, that is, pre- and post-test gain scores were compared. Also, error rate data and subjective-questionnaire data were gathered, and the program revised accordingly. Among the results of these evaluations I would like to note that individual items were removed or rewritten or rearranged; rewriting of instructions took place several times; and a different response device, that is, a different printed format, as developed on the basis of the formative studies.

Turning to the second part of the evaluation of this program, the gathering of data for summative evaluation,⁶ the final version of the program, Reading for the Main Idea, was run as a comparison of

⁵ Raygor, Alton L. and Summers, Edward G., "A Comparison of Two Methods of Teaching Reading Comprehension To High School and College Students" in *The Twelfth Yearbook of the National Reading Conference*, Milwaukee, Wisconsin, 1963.

⁶ Wark, David M., Raygor, Alton L. and Gerard, Lyle, "Reading for the Main Idea: An Evaluation" in *College and Adult Reading VI, The Sixth Yearbook of the North Central Reading Association*, Minneapolis, Minnesota, In Press.

four groups in a Solomon 4-group design: that is, there were two treatment groups, one with, one without pre-tests. This design was recommended by Campbell and Stanley in the Gage Handbook on Research in Education.⁷ These data, which comprise the *summative* evaluation, will be published with the material.

This concludes the three examples that illustrate the central thesis of this paper: that this type of evaluation of materials is probably the most fundamentally radical change to occur in educational publishing in a long time.

I would like to summarize what we have been discussing by saying that the above studies do not represent a typical picture of what McGraw-Hill or, to my knowledge, any other major publisher is doing the majority of the time in their publication efforts. We still rely, for the most part, on both the author and the editor intuitively deciding upon what makes or does not make something an effective teaching instrument. And, of course, the purchasers of such materials are relying upon just such intuitive measures themselves, so there is a matching of efforts and a correspondance of procedures here. As I said, the three examples which I mentioned this morning are not typical of what we are doing. Rather, they represent goals to aim for, if we are convinced that careful *formative* and *summative* analysis of materials will result in superior learning instruments. But I believe we are on a two-way street: unless the consumer, the school boards, the adoption committees, the teachers themselves, develop their own standards based on the techniques of evaluation, the publishers will not continue or increase efforts to provide performance data. I mention this because, while demands in the literature for validated materials increase in number and intensity, we have found that they are still almost nonexistent from the market itself.

I'm pretty sure the market will find its voices, but that can't be too soon.

⁷ Campbell, Donald and Stanley, Julian, "Experimental and Quasi-Experimental Designs for Research on Teaching," Chapter Five in Gage, *Handbook on Research in Education*, Rand McNally.

An Investigation of the Interrelationships Among Certain Specific Predictor Variables and Two College Bound High School Student Reading Enhancement Classes

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INTRODUCTION AND RATIONALE

There are almost as many definitions of reading as there are well known "experts" in the field of the communication arts. These familiar and often used definitions range from a rendering of reading as a response to graphic stimuli to a version which equates reading with critical thinking. However, there seems to be a consensus of a kind inherent within all of these explications. The common area of agreement appears to be predicated on the assumption that in order to be a successful reader, one must achieve total individual involvement in and through the reading act.

Although the preceding assumption appears to underlie the opinions espoused and research promulgated by the various communication specialists with regard to the teaching and acquisition of reading skills, the assumption is seldom controlled and treated scientifically in the research studies produced. This is especially the case with regard to secondary reading improvement programs. A review of the pertinent literature reveals that most investigations of this type are procedural or methodological studies involving a comparison of pre- and post-test results with little or no attention being paid to other significant intervening variables. Such factors as sex, race, high school, college board scores, chronological age, choice of college or university, and socio-economic status are usually viewed in isolation or ignored entirely.

Therefore, this investigation was designed to study the general reading attainment realized by college bound senior high school students through the control of the above mentioned intervening variables in an attempt to obtain a clearer perspective with respect to "total reader involvement."

DELIMITATION AND CRYSTALIZATION OF THE PROBLEM

There have been a number of research reports which have had as their primary focus, descriptions of the appraisals of effectiveness or

adequacy of reading improvement programs. Fedde, Kover, Acker, Tuckey, and Wedeen for example, have evaluated reading improvement programs in terms of materials and procedures employed. None of the studies reviewed, however, examined the college-bound secondary student with respect to the effects of certain variables on general reading proficiency when these were considered both in isolation and combinatorily. This was the purpose of the study reported in this paper.

NULL HYPOTHESES CONSIDERED

- I. Significant achievement gains in vocabulary, rate, and comprehension as measured by the *Nelson Denny Reading Test* will not occur during the course of the reading improvement program.
- II. Any gain in vocabulary, comprehension, or rate as measured by the *Nelson Denny Reading Test* is not dependent on any of the following variables:
 - A. Sex
 - B. Race
 - C. School attended
 - D. Intelligence
 - E. College board scores
 - F. Chronological age
 - G. Choice of college or university
 - H. Socio-economic status

THE SAMPLE

The sample of forty-four college-bound high school seniors was drawn from nine secondary schools representing the three counties of Amelia, Nottoway, and Lunenburg located in rural Southside, Virginia. Only those students were admitted to the reading improvement program whose initial test results and cumulative record information indicated that their intelligence levels, reading achievement levels, and socio-economic divisions were distributed over the entire range of traits and those who had been admitted for the coming fall term to a college or university.

That this sample was representative of high school pupils at these ages and grade level can be seen from the data in Table I, II, and III. The mean IQ was 104 and the mean age was approximately seventeen and one half years while the mean overall reading achievement level fell at approximately the 10th percentile as based on twelfth grade norms. There were approximately 80 per cent Caucasian and 20 per cent Negro and the mean socio-economic level was four, which falls at the mid-point on the Warner Scale of Socio-Economic Status. Therefore, generalizations to real populations are appropriate. Specifically, forty-four students were retained for this investigation since the results indicated that their intelligence levels, socio-economic di-

TABLE 1
Mean and Standard Deviation
Reference Data on Subjects by Age, Intelligence,
Reading Achievement, and Socio-economic Status

Variable	Mean	SD
Age in Months	204.56	12.27
IQ in Months	103.81	14.19
Socio-economic Status	3.84	1.47

visions, and reading achievement levels were distributed over the entire range of these traits.

INSTRUCTIONAL METHOD

The pupils were divided into two distinct classes in order to diminish the student-teacher ratio. Each class of twenty-two students convened two times per week on a two hour basis per session for twelve weeks. Both classes were taught by the same reading specialist.

The *Nelson-Denny Reading Test*, Forms A and B were used as the pre- and post tests. Table II indicates the results of the pre- and post-tests. Initially, after pre-testing, the pupils were appraised of their test results and were informed as to the kind of instruction they could expect.

The method of instruction was the same for both classes and consisted of those instructional procedures described by Johnson in 1967. Essentially, these procedures involved instructing each student on an individual basis, and the utilization of controlled reader and tachistoscopic sessions where mean class performance was utilized as the point of instructional initiation and through a personalized series of tasks termed a task schedule. The task schedule employed an abundance of rate and comprehension devices, programmed and linguistic materials, various practice and HILD materials, and sundry occupationally oriented series.

ANALYSIS AND RESULTS

The study was designed so that the analysis of the data could be accomplished by the variance and covariance techniques of multiple linear regression as described by Bottenberg and Ward (1963).

Such an analysis employs criterion and predictor variables in Full and Restricted Regression Models. The criterion variables were the individual raw scores derived from the three different sub-tests (vocabulary, comprehension, and reading rate) of the *Nelson Denny*. Each of the three criterion variables gave a Full Regression Model.

The predictor variables included sex, race, senior high school attended, intelligence, college board scores, chronological age, choice of college or university, socio-economic status, and initial *Nelson-Denny* scores measuring vocabulary, comprehension, and rate.

Restricted Models were generated for each hypothesis to be tested. It was hypothesized that achievement gains in *Nelson-Denny* vocabulary, comprehension, and reading rate would not occur during the course.

It was further hypothesized that any gain in vocabulary, comprehension, or rate was not dependent on any of the factors of sex, race, school attended, intelligence, college board scores, chronological age, choice of college or university, or socio-economic status when certain other factors were controlled by covariance.

The hypothesis that there would not be significant achievement gains was rejected (5 per cent significance level) for vocabulary and for reading rate and was accepted for comprehension. The means and standard deviations of the pre- and post-measures of the criterion variables are shown in Table II.

TABLE II
Means and Standard Deviation of Criterion Variables Based on
Twelfth Grade Nelson-Denny Reading Test Norms

	Vocabulary in Percentiles		Comprehension in Percentiles		Reading Rate in Words Per Minute	
	Form A Pre	Form B Post	Form A Pre	Form B Post	Form A Pre	Form B Post
Mean	37.68	42.54	45.79	47.64	266.68	353.32
Standard Deviation	14.58	16.20	12.30	13.28	56.42	87.38

Results indicated that any achievement gain in vocabulary could not be attributed to any of the predictor variables except initial score ($P < .001$).

Findings indicated that achievement gain in comprehension could be attributed to initial score ($P < .01$) and to ability as measured by IQ and total college board score ($P < .05$). Relationships between gain in reading rate could be attributed to initial rate ($P < .05$) and to ability as measured by IQ and college board total score ($P < .01$).

In summary, significant gains were made in vocabulary and in reading rate, and the achievement gains in the criterion variable were not affected by the factors of sex, race, socio-economic status, or school attended. They were all affected by initial scores. Gains in comprehension and reading rate were affected by ability as measured by IQ and total college board scores. The relationship of comprehension gain to choice of college or university approached significance and deserves further study as a motivation factor.

The F ratios for the analysis of variance with covariance are presented in Table IV.

TABLE III
Reference Data on Subjects in Number and Percent
by Sex, Race, and School Selected

Variable	Number	Percentage
Male	24	54.5
Female	20	45.5
Caucasian	35	79.5
Negroid	9	20.5
University of Virginia	2	4.5
RPI	9	20.5
William and Mary	2	4.5
Junior College	15	34.5
Virginia State	6	13.5
Radford	6	13.5
North Carolina College	2	4.5
Hollins	2	4.5

CONCLUSIONS AND INFERENCES

This investigation involved a consideration of those variables usually reported by others in the literature and additional ones not usually included but deserving of further study.

Since significant gains were made in vocabulary and reading rate as measured by *Nelson-Denny*, it was concluded that this program was successful.

As the gains in the three criterion variables were not affected by any of the factors of sex, race, socio-economic status, or school attended, and since each of these students had been accepted for admission by a college, it might be concluded that there is a time in a per-

TABLE IV
Analyses of the Effects on Achievement Gain in Criterion
Variables Attributed to the Variables Listed

	Number of Predictor Variables	F	df ₁	df ₂	Probability
Vocabulary					
Affected by:					
1. initial score	12	51.7**	1	19	.000001
Comprehension					
Affected by:					
1. initial score		8.17**	1	19	.009
2. IQ & College Board Total *		4.01*	2	19	.03
3. choice of College or University		2.59	2	19	.10
Reading Rate					
Affected by:					
1. initial score		25.42**	1	19	.00001
2. IQ & College Board Total		9.26**	2	19	.001

* Significant at the .05 level

** Significant at the .01 level

son's development when the factors previously affecting his performance no longer are as relevant as they once were. This view rather than the more ordinary one which holds that these students do not vary enough on the background factors to demonstrate an effect can be supported by looking at the raw data which depicts the wide distribution of these characteristics and by considering the close to significant effect of choice of college or university on gain in comprehension and reading rate. Thus factors depressing and restricting college acceptance expectations may no longer be relevant once acceptance is gained, since at that time new criteria related to the specific college expectations become meaningful and dominant in determining the person's achievement. However, it should be noted that even in this study achievement was modified by the constraints of the individual's beginning achievement and by his ability for academics.

Such an interpretation perhaps also explains the success of students in such projects as Upward-Bound and points out the wisdom of raising future expectations to overcome past or immediate hindrances or obstacles.

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Improving the Junior College Reading Programs

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The administrator has a vital interest in the reading program in today's school. The complexity of our social order, coupled with parental anxiety about reading, has forced the administrator to become deeply involved in a knowledge of the purposes and techniques of reading instruction.

According to a University of Illinois study, 48 per cent of American high school students are seriously handicapped by poor reading. Junior college students are hurt more by poor reading habits than by any crippling disease. The well-known English essayist and poet Joseph Addison says "Reading is to the mind what exercise is to the body. As by the one, health is preserved, strengthened, and invigorated; by the other, virtue (which is the health of the mind) is kept alive, cherished, and confirmed."

Recent studies show the following:

1. As many as 16 million Americans are functional illiterates. They cannot read above the 4th grade level.
2. Eight million adults over the age of 25 cannot read the equivalent of a daily newspaper.
3. Twenty-seven per cent of army draftees failed the mental examinations because they are disabled readers.
4. Fifteen per cent of our high school graduates are seriously handicapped readers.

The functional illiterates could populate a state the size of New York.

POINTS FOR CONSIDERATION BY ADMINISTRATORS

Reading skills are the very heart of the junior college program. Just as a cable is composed of numerous wires which are interwoven, so, too, the reading program is composed of many skills which are woven together for the benefit of the student. There are four growth areas in reading skills—word identification, speed, meaning or comprehension, and study skills. Each area entails many skills and sub-skills.

The administrator must keep an open mind and withhold judgment in regard to all the innovations; there are many methods and materials coming out concerning the reading skills, and the administrator should be slow to choose. He should use extreme care and much careful thought before he goes to one method or the other. All people concerned should be considered, the teachers as well as the administrators. The teachers should be informed about all the meth-

ods and then after careful consideration, whatever seems best for their particular situation should be used. Be open-minded and experiment before making up your mind.

Work for more adequate training of teachers; the in-service education program should be adopted to increase the knowledge and improve the performance of the teachers in the school, and toward that end the in-service program should be a continuous effort from year to year, and the teachers should have some say in what they would like to be taught. Audio-visual devices and demonstrations should be used. The employment of a special reading teacher to go to various rooms and demonstrate the skills that are used in subject matter areas is recommended. Also, a committee to examine any new literature that comes from the press should be appointed. There ought to be a closer communication between the administrators and teachers so that jobs can be better defined. There is a dire need for books and supplies; screen your budget so as to supply as many books and materials as is possible. They are essential for the effective teaching of reading.

Administrators are the ones who are responsible for the kind of education in our schools. The reading program will be no better than the kind of leadership provided. Administrators need to do more selling of the product, reading, than has been done. Sell the reading program.

The challenges or problems that are before administrators if they are to have a sound reading program are these:

A major challenge arises in the need for a systematic program of professional stimulation, study, and teacher growth within the college. Most gains in this program have been made where the administrators have not been doing the job themselves, but have been working behind the scenes to stimulate, guide, and direct a program of professional growth on the part of their teachers. Greatest gains are made where teachers are working as a team for professional improvement and toward specific goals. A reading committee composed of teachers should be set up in order to spearhead various areas of improvement and to study current professional literature. At each professional meeting, they could begin with a short report of an article read from a professional magazine, going over the progress made but always with the idea in mind of what the implications are for their particular college. A summary sheet of research findings and digests of articles and studies being reported in professional literature can be organized. This bulletin can come out two, three, or even four times a year. It can be mimeographed and should be made up of very brief (not over one paragraph) summaries describing the new techniques which are being discovered and used in the research field in their various content areas.

Another method which can help is one in which the administrator encourages his teachers to look into past data concerning information on ability, adaptability, etc., in an effort to make an honest appraisal. This will inform the teachers where the strengths and weaknesses are, and they will know better where to put forth more effort or try new techniques.

All of these things have been done and are being done in various school systems. These methods succeed because far-thinking administrators are working through a staff or committee of dedicated and unified teachers who are all striving for the same goal, improvement.

Another challenge for the administrator is the need for increased library facilities. He should put thought into what the students are encouraged and taught to read and like. A sound reading program cannot be contained between the covers of a basic book. It is far more than that and relates to itself many, many other materials to extend and encourage an interest in reading widely and broadly. Thus, it is imperative to improve the library. The necessary money must be spent to provide an adequate library that will be a strong support to a sound reading program.

Still another goal to achieve is professional growth. The professional leaders in the schools must be up-to-date in the program of reading. They need to be able to speak authoritatively on any question concerning reading which might come up from any teacher. Administrators, then, need to keep abreast of current readings and papers in order to help their schools constructively along all lines. It is up to the administrators to keep a sound reading program going in the schools.

HOW WELL DO ADMINISTRATORS HELP THE READING PROGRAM?

There are four parts to any reading program in a school. The first part consists of the regular developmental reading program which teaches basic reading skills of word recognition and comprehension. The second part is the remedial reading program which is necessary for the student who simply did not achieve to his capacity in the developmental program or missed it entirely, and it is necessary and essential for him to have this work. Reading difficulties can sometimes be remedied by a little extra effort. The third part is the application of these skills in all the content subjects, whether they be math, science, English, history, or literature by the subject area teachers in the Junior Colleges. The fourth part of the reading program is supplementary reading that is provided for through access to an extensive number of textbooks as additional reading to basic studies as well as a varied supply of library books that are used in connection with the content subject as background and as unrestricted free reading. This practice should take into account the books in the local public library as well

as the books the student had access to at home. This is what is meant by improving reading in schools.

Do administrators help this program? In mentioning some points on both sides of the question, we will first take a negative stand. Administrators who hire poorly prepared teachers do not help when these teachers are not supplied with adequate help to improve themselves. Any teacher can become a better one with proper help from the administrator.

Administrators hurt the reading program when they require a teacher to teach outside his field of preparation. Often an English teacher is asked to take charge of the reading program even though he is not prepared to do so, while another teacher who is competent and has had training in the reading program is not given the opportunity. Of course, if administrators do ask for and assign reading teachers to supervise and carry out the reading program and give them help and assistance that is necessary for a successful reading program, then they will indeed help the reading program.

Another abuse occurs when administrators pinch the budget and refuse to approve money for the materials which are necessary for a basic reading program, or when they waste money on expensive machines or gadgets instead of getting the necessary books and materials which the reading teacher has asked for. Too often these machines wind up collecting dust in the basement, and the money spent on them does no one any good. Of course, some machines are good and should be used. They must be used. They must be used properly in accordance with the manufacturer's recommendations, and the advice of a reading expert should be sought before buying one. However, more essential are additional textbooks for fill-in and background material. Administrators need not only to build up a basic inventory of books but also to replace lost or worn-out books.

Another failure in building an adequate reading program occurs when the administration buys a specific system for teaching reading that teachers cannot teach, that is not adapted to the age and type of students who come to their school. Some of the systems that are being sold have the teacher doing thus and so on the first day and thus and so on the second day and so on in an impossible sequence. Students are individuals and have to be taught and respected as such. The reading program has to be geared to their speed, intelligence, and ability to carry it out. We need to have methods used in the school and promoted by the administrators that are based upon the best knowledge we have relating to how learning occurs. Administrators ought to consult the reading teachers for suggestions before buying a reading program. There are many effective ones on the market today.

Administrators can also help if they have the knowledge of the methodology of how reading is taught. Administrators who merely

think they know how to teach reading do not actually help the reading program. The ones who get themselves qualified by attending conferences, by taking courses on reading, by reading research, or by asking a qualified teacher to give them the necessary information are the administrators who help the reading program.

Administrators who allow teachers to attend reading conferences are helping the teacher to help himself, or allow the teacher to attend a session at another school that will help him in some particular aspect of his work. Assistance such as this not only helps the teacher, but allows for a much closer relationship between teacher and administrator by which both mutually benefit.

Here are some questions that each administrator needs to answer: First, are we completely sold on the importance of reading in an age of mass media? The literary experience is one of the most profound in the life of man. It keeps cultures alive, makes instruction from such books as the Bible and famous philosophers possible; it joins the minds and times together for the better management of our world today.

Should all subject area teachers have a responsibility to teach reading as it affects their subject? When the teachers are not qualified, perhaps the school should provide an adequate in-service program for them.

Are strong reading programs predicated upon a sound grouping policy and are adequate materials provided?

Are we agreed that special reading classes should be staffed by reading specialists for children with reading problems?

These are some of the questions that administrators should ask themselves when thinking about the reading program in their school.

SOME ANSWERS TO THE PROBLEMS

Several steps that have been taken by Junior College administrators who have successful reading programs in their schools appear to be the following:

1. The administrators and teachers should acquaint themselves with the various types of programs, materials, and techniques that are available. Then a study should be made of students in the school to determine the learning habits of the students and their present capacity to read. The results would possibly determine the type of program for their particular school. Most tests will show that the reading problem is an all-school problem, and an all-school developmental program would best help this situation. This would enable the slow, normal, and gifted students to all become better readers.
2. Everyone should become interested in reading: teacher, and the administrator. We need to keep stressing the fact that every teacher is a teacher of reading until this fact becomes a reality, and reading

becomes, in fact, the concern of all—the teacher, the pupil, and the community. Developmental reading is not the same as remedial reading. It is for all students regardless of ability because it helps to improve reading skills. One thing that must be remembered is that students are individuals. As such, some will be below, some at, and some above the academic level. And the need is to develop a concept of teaching that adapts to differences in reading and in capacity to learn.

3. The administrator should give thought to evaluating his present program with the help of his staff to discover the areas of success or failure and to discover teachers who are leaders in the reading program.

Consultant service should be provided for the teacher—specialists who can help them with particular students and with particular instructional problems, specialists in teaching remedial reading, and specialists in teaching in all areas encompassed by the school programs. But the classroom teacher should be the basic organizer and planner for the group and the individual in the class. This plan will cost money; it may even double current expenditures for education. Americans will pay their share of the cost because they believe that our junior college students today have to have a better education than that promised by other countries working for our downfall. Education of today's children is much more important than getting to the moon first.

Administrators should replace teachers who after a year or two of trial are obviously not qualified by background of culture, educational level, personality, drive, and dedication to be members of a highly qualified professional team.

In every junior college an instructional secretary is needed to serve the teachers. A secretary should not be assigned to more than 12 teachers. Professional persons need highly trained assistants. That is to be noted in the validity of the teacher aide idea.

The school should provide the basic classroom teacher with other kinds of assistance and materials such as audio-visual aids, taped television shows that may be used by small groups as well as large ones, listening tables, models, space and equipment so that several different groups or individuals can proceed simultaneously.

In summary, the answer to our original question depends upon whether or not junior college administrators recognize the importance of reading instruction and support it; hire teachers who can teach; furnish adequate materials in order to teach students how to read; promote secretarial help; support methods based on sound principles; provide adequate libraries; arrange for adequate space and time to teach; maintain an open mind about methods of teaching reading and make judgments on the basis of information, not opinion; with-

stand irresponsible pressure groups; support teachers in their methods and discipline; and provide an in-service program for the improvement of reading based upon what the teacher needs. The result will be a constant and enriched reading and learning atmosphere for junior college students.

Given these conditions, we can achieve great goals in reading instruction. The reward will be, as Anthony Trollope, the English novelist, promised his young friends, "With reference to this habit of reading, I make bold to tell you that it is your pass to the greatest, the purest, and the most perfect pleasure that God has prepared for His creatures."

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Turning on the Junior College Student

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"Tune in, turn on, and drop out" has become the motto of a vociferous group of students across the country. While many students do drop out, many others remain in college who have tuned their instructors out and have not been turned on by anything instructors have had to say.

What are today's students like? Perhaps there is more heterogeneity in a junior college than in a senior college because of the open-door admissions policy. Heterogeneity especially exists in a developmental, remedial reading program because this area sometimes becomes a sort of dumping ground for the misfits, emotional cripples, the physically handicapped, and the mentally inferior as well as some superior students. It is with this range of students in mind that I shall present to you the typical groups with whom I have come in contact in the last few years.

- I. The Glamour Girl
 - A. has come to college to find a husband.
 - B. is a fashion plate.
 - C. reads *Glamour*, *Vogue*, and *Mademoiselle* (nothing else).
 - D. knows she is beautiful.
- II. The Mama's Boy
 - A. wants to be mothered.
 - B. tells you, in detail, about his illnesses and problems.
 - C. is very immature socially, physically, and emotionally.
- III. The Intellectual Snob
 - A. rarely enrolls in a reading course, but when he does, he likes to impress others by naming all of the difficult books he has read.
 - B. usually wants to read underground and *avant-garde* literature.
 - C. assumes that no instructor has anything to say to him.
 - D. is pseudo-sophisticated.
- IV. The Hippie
 - A. is revolting against "The Establishment."
 - B. wants revolutionary changes *now*.
 - C. dresses like the prophets of old and considers himself a modern seer.
- V. The Housewife
 - A. has often been a good student in high school many years ago.

- B. has a great deal of anxiety about grades, leaving children, and other problems.
 - C. lacks self-confidence.
 - D. has trouble following directions.
 - E. may be in school for therapeutic reasons.
- VI. The Vietnam Veteran
- A. is usually quite mature but we suspect at 18 he was very immature.
 - B. is less provincial than his fellow students.
 - C. feels "tied down" and cannot accept traditional values as he once did.
 - D. occasionally resents the irresponsibility of younger students.
- VII. The Sleeper or the "Goof-off"
- A. may be tired from working too many hours outside of school.
 - B. may have a physical problem.
 - C. stays out too late at night.
- VIII. A Type of Athlete (member of the Sweatshirt Heroes, Inc.)
- A. expects to be idolized by other students.
 - B. has low I.Q. and third-grade-level reading ability, but the coach expects him to be reading college texts in one semester.
- IX. A Type of Foreigner
- A. has a continental style and beautiful manners.
 - B. has trouble expressing himself.
 - C. may have been used to "crossing the palm" in order to get grades.
- X. The Playboy
- A. is an "apple-polisher."
 - B. makes alibis that sometimes stretch the credibility gap.
 - C. spends his time at the Student Union.
- XI. The Good Kids
- A. have learned to do exactly as they are told.
 - B. never have an original thought.
 - C. do not learn enthusiastically.
 - D. memorize facts enough to pass the examination, but forget them the next day.
- XII. The (Genuinely) Mature Student
- A. has realistic goals but is also idealistic.
 - B. has an inquiring mind.
 - C. asks intelligent questions.
 - D. can be most frustrating to an instructor who is trying to "cover the subject."

You have been introduced to the raw material. Our job is to turn these assorted pupils into students. Today's students are a different "breed of cat" to use the youthful vernacular. The kind of teaching which was good enough for former generations is not good enough for today's generation. They are not easily fooled. Television has taught them to be sophisticated, selective, suave, and subtilized. We are being asked, as teachers, to accept some pretty "weird" characters into our classrooms. We are told, "Go along with the mod hairdos, the unkempt ones, etc. as much as you can." What is youth trying to tell us by this bizarre behavior? That we are all squares? That we are not hip? That we'd better swing with the times? I don't believe that for one minute. I believe youth is saying to us, "Pay attention to me; I'm an individual. I'm a human being, not a cipher, not a statistic in someone's research paper." And we must listen!

In the last twenty years as these students were growing up, what kind of home life have most of them experienced? The standard of living has risen considerably because Dad is able to earn a fairly good income, supplemented by moonlighting in many instances. Mom never had much in a material way, as a child, so she feels that if she works, she can afford some of the niceties of life for herself and, she rationalizes, for her children. A typical night repeated through the years: After a hurried meal, Mom and Dad are tired and feel they owe themselves a few moments of relaxation so they watch television until bedtime. The children are admonished, "Go do your homework now, then you may watch television with us." The parents do not mean to shut off communication with their children, but do you know of a better way to stifle communication?

What have these same children experienced in public schools? In some cases, 35 to 45 children were placed in one classroom. The teacher probably "herded" them, but how much individualized attention could one teacher give that many students? How much actual teaching was done when weighed against the time devoted to keeping order?

When students are asked about various teachers in school, most young adults point to two or three favorites. Invariably, we sense that the favorites were those teachers who took time to listen and actually be interested in individuals.

When we, as teachers, really look at ourselves introspectively, is it any wonder that we have trouble motivating our students to learn? How do you react when you go to a new church, for instance, and are totally ignored? How would you feel if you moved to a new teaching position or a new neighborhood and were treated very politely but never with any real warmth?

Now many of you are saying, "I am interested in my students, and I'm not guilty." Most of the time students are diagnosed carefully, both formally and informally. They fill out personal data sheets, take a

good habits analysis test, take an I.Q. test, an eye test, various reading tests, etc. In short, everything but a cardiogram.

I'm not minimizing the value of a thorough diagnosis of reading problems and everything related to reading. However, did you ever get the feeling you were being put on? It seems that a student can answer all the questions, write an autobiography, usually very prosaic, and go through the whole procedure without revealing anything about himself. Are we at the point, as someone has so aptly stated, of suffering from the "paralysis of analysis?"

And what of our teaching methods? Admittedly, teaching methods are being updated and are better than those used twenty years ago. However, some of our instructors either have not been to school in twenty years or else refuse to accept new methodology. Such failings remind me of a young rural school teacher who asked the president of his board for some chalk and erasers. He was told that "Abraham Lincoln didn't have no chalk and erasers, and he got to be president, so what do you need with chalk and erasers?" Any teacher, of course, if he is a real teacher, can teach even if he sits on one end of a log and the student sits on the other end. It helps, however, if he has a few tools with which to work.

At Odessa College, all teachers must earn eight graduate hours in their particular fields every three years, regardless of the degree held at the present. Although I may "gripe" about the regulation, I believe it to be a very good one. We must keep up-to-date and not allow ourselves to settle in the slough of self-indulgence or ride on the wave of notoriety received when our last article or book was published.

How, then, can we motivate today's students, especially in a reading program? After working with junior college students for eleven years, I believe that nearly every student can be motivated to try to reach his highest level of reading ability. It is my firm conviction that, although a teacher possesses knowledge about reading, methodology, research, etc., he must develop those qualities of personality that will promote a feeling of warmth between student and teacher. I have had to train many teachers myself because I live in a rather remote area where no trained professional reading teachers were available and have discovered that the ones who succeed are the ones who have a great warmth and concern for their students. Some of these teachers are now in other junior colleges in Texas, establishing their own reading programs.

The difference between an on-going, alive reading program and one that dies on the vine is all found in one word: motivation. Young has made the following observation about motivation: (1, p. xi)

Motivation is a word that wears a halo. It is like justice, democracy, freedom. Everyone approves of it, yet there is little agreement as to what it means. Furthermore, the whole field of motivational psychology is characterized by turmoil, confusion, and uncertainty.

It seems reasonable to assume from this statement that an instructor may do almost anything to motivate as long as it works. Here are some ideas for teachers that I have found helpful:

1. Treat every individual as if he is the most important in the world.
2. Expect hostility toward reading and the instructor and let students know that you understand why they feel that way.
3. Administer huge doses of T.L.C. (tender loving care), but at the same time exhibit "tough love" or an attitude of "I respect you, but I expect you to do your work."
4. Develop a sense of humor when a student says, "I hate all reading." It's better to express a "So now we know" attitude rather than lecture on the virtues of reading.
5. Help the student to gain an adequate self-concept. Many are discouraged and scared. They put up a strong front but inside are really defenseless.
6. Recognize good progress often. Heap praise upon each effort, no matter how meager.
7. Act as a buffer between the student and other faculty members. Never criticize a colleague, but encourage the student to visit the instructor and get acquainted. If this is not successful, help the student as much as possible.
8. Set definite objectives for the course to make it worthwhile.
9. Provide a situation conducive to learning but at the same time create an atmosphere of informality.
10. Listen to gripes. You probably won't be able to do much about them, but the student needs to have someone with whom to talk.
11. Guard against rigidity of form. If students tire of working with certain reading materials, introduce new ones. Students in a reading program often have a very short attention span.
12. Keep each student informed of his progress by short conferences.
13. Be willing to counsel students who willingly seek a friendly relationship on an adult level.
14. Insist upon self-competition rather than competition with others.
15. Encourage experimentation in reading. Read one selection in one way, then try other ways until the student finds out what works for him.
16. Demand that students attend practice sessions.
17. Insist upon a student working up to his potential at all times.
18. Remember that although he may never even get through college, he needs to read adequately for even the most humble station in life. We are building citizens, not automatons with mechanized brains for storing knowledge.

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